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Proposed Registration Document PRD2014-14

Metconazole

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Overview

Proposed Registration Decision for Metconazole Fungicide Technical

Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of Metconazole Fungicide Technical and the associated end-use product, Metlock Fungicide, containing the technical grade active ingredient metconazole, for early season control or suppression of seed- and soil-borne fungal pathogens in canola, rapeseed, carinata, corn and wheat.

Two additional metconazole end-use products, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant, are co-formulated with the active ingredients metalaxyl and clothianidin. Metalaxyl is currently registered for seed treatment use on the proposed crops. Clothianidin is conditionally registered for use as a seed treatment on all of the proposed crops with the exception of wheat. The PMRA, under the authority of the *Pest Control Products Act* and Regulations, will be granting conditional registration for the sale and use of the end-use products NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant due to the registration status of the clothianidin.

An evaluation of available scientific information found that, under the approved conditions of use, the product has value and does not present an unacceptable risk to human health or the environment.

This Overview describes the key points of the evaluation, while the Science Evaluation provides detailed technical information on the human health, environmental and value assessments of Metconazole Fungicide Technical and the end-use products Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant.

What Does Health Canada Consider When Making a Registration Decision?

The key objective of the *Pest Control Products Act* is to prevent unacceptable risks to people and the environment from the use of pest control products. Health or environmental risk is considered acceptable[1] if there is reasonable certainty that no harm to human health, future generations or the environment will result from use or exposure to the product under its proposed conditions of registration. The Act also requires that products have value[2] when used according to the label directions. Conditions of registration may include special precautionary measures on the product label to further reduce risk.

To reach its decisions, the PMRA applies modern, rigorous risk-assessment methods and policies. These methods consider the unique characteristics of sensitive subpopulations in humans (for example, children) as well as organisms in the environment (for example, those most sensitive to environmental contaminants). These methods and policies also consider the nature of the effects observed and the uncertainties when predicting the impact of pesticides. For more information on how the PMRA regulates pesticides, the assessment process and risk-reduction programs, please visit the Pesticides and Pest Management portion of Health Canada's website at healthcanada.gc.ca/pmra.

Before making a final registration decision on metconazole, the PMRA will consider all comments received from the public in response to this consultation document.[3] The PMRA will then publish a Registration Decision[4] on metconazole, which will include the decision, the reasons for it, a summary of comments received on the proposed final registration decision and the PMRA's response to these comments.

For more details on the information presented in this Overview, please refer to the Science Evaluation of this consultation document.

What Is Metconazole?

Metconazole is a triazole fungicide (demthylation-inhibiting fungicide) that inhibits sterol biosynthesis and is currently registered for foliar uses. Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant are seed treatment fungicides for broad spectrum control of early-season diseases.

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1 "Acceptable risks" as defined by subsection 2(2) of the *Pest Control Products Act*.

2 "Value" as defined by subsection 2(1) of the *Pest Control Products Act*: "the product's actual or potential contribution to pest management, taking into account its conditions or proposed conditions of registration, and includes the product's (*a*) efficacy; (*b*) effect on host organisms in connection with which it is intended to be used; and (*c*) health, safety and environmental benefits and social and economic impact."

3 "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

4 "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

Health Considerations

Can Approved Uses of Metconazole Affect Human Health?

Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant are unlikely to affect your health when used according to label directions.

Potential exposure to metconazole may occur through the diet (food and water) or when handling and applying the product. When assessing health risks, two key factors are considered: the levels where no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers). Only uses for which the exposure is well below levels that cause no effects in animal testing are considered acceptable for registration.

Toxicology studies in laboratory animals describe potential health effects from varying levels of exposure to a chemical and identify the dose where no effects are observed. The health effects noted in animals occur at doses more than 100-times higher (and often much higher) than levels to which humans are normally exposed when pesticide products are used according to label directions.

The technical grade active ingredient, metconazole, was moderately toxic to rats and highly toxic to mice when given as a single oral dose. It was of low acute dermal toxicity to rats and rabbits and of low acute inhalation toxicity to rats. It was moderately irritating to the eyes and non-irritating to the skin of rabbits. It did not cause an allergic skin reaction in the guinea pigs. The signal words, "DANGER – POISON" and "EYE IRRITANT" have been included on the label in light of these findings.

Metlock Fungicide and NipsIt SUITE Canola Seed Protectant were of low acute oral, dermal and inhalation toxicity and were minimally irritating to the eye and skin of the rabbit. They did not cause an allergic skin reaction.

NipsIt SUITE Cereals OF Seed Protectant was found to be of low acute toxicity via the oral, dermal and inhalation routes of exposure. It was non-irritating to the eye and slightly irritating to the skin of the rabbit. It did not cause an allergic skin reaction.

Health effects in animals given repeated daily doses of metconazole over longer periods of time were decreased body weights, effects in blood (regenerative anaemia) and microscopic changes to the liver, spleen and adrenal glands. There was no evidence that metconazole damaged genetic material. Skin tumours in male mice were observed following oral administration. There was no evidence of cancer in rats.

When metconazole was orally or dermally administered to pregnant rabbits, cranio-facial malformations were observed in foetuses. Limb-flexure malformations were observed in foetuses when metconazole was administered dermally to pregnant rabbits. These effects were observed at doses that were not toxic to the mother, indicating that the foetus is more sensitive to metconazole than the adult animal. Due to the serious nature of these endpoints, extra protective

factors were applied during the risk assessment to further reduce the allowable level of human exposure to metconazole.

The risk assessment protects against these effects by ensuring that the level of human exposure is well below the lowest dose at which the effects occurred in animal tests.

Residues in Water and Food

Dietary risks from food and drinking water are not of health concern.

Aggregate dietary intake estimates (food plus drinking water) revealed that the general population and infants less than one year old, the subpopulation which would ingest the most metconazole relative to body weight, are expected to be exposed to less than 56% of the acceptable daily intake. Based on these estimates, the chronic dietary risk from metconazole is not of health concern for all population subgroups.

The lifetime cancer risk from the use of metconazole is not of health concern.

Acute dietary (food plus drinking water) intake estimates for females 13-49 years old were less than 83% of the acute reference dose, and are not of health concern. For all other subpopulations, an acute reference dose was not established; therefore an acute dietary intake estimate is not required.

The *Food and Drugs Act* prohibits the sale of adulterated food, that is, food containing a pesticide residue that exceeds the established maximum residue limit (MRL). Pesticide MRLs are established for *Food and Drugs Act* purposes through the evaluation of scientific data under the *Pest Control Products Act*. Food containing a pesticide residue that does not exceed the established MRL does not pose an unacceptable health risk.

Residue trials conducted throughout Canada and the United States using metconazole on wheat as a seed treatment are acceptable. MRLs to cover residues of metconazole in/on wheat and commodities in the rapeseed subgroup have been established based on residue data generated following foliar applications. The seed treatment uses of metconazole on wheat and canola are not expected to result in residues exceeding the established MRLs. The results of the radiotracer study with metconazole as a seed treatment in corn indicate that finite residues of metconazole are not anticipated in corn commodities from seed treatment use of metconazole. Maximum residue limits will be established for corn at the limit of quantitation of the enforcement method. The MRLs for this active ingredient can be found in the Science Evaluation section of this Consultation. There are no food or feed commodities associated with the uses on carinata and rapeseed under the proposed labels.

Occupational Risks From Handling Metconazole

Occupational risks are not of concern when NipsIt SUITE Cereals OF Seed Protectant, NipsIt SUITE Canola Seed Protectant and Metlock Fungicide are used according to the proposed label directions, which include protective measures.

Workers who treat with NipsIt SUITE Cereals OF Seed Protectant, NipsIt SUITE Canola Seed Protectant or Metlock Fungicide, or plant treated corn, canola, rapeseed, carinata and wheat seed can come in direct contact with metconazole residues on the skin and through inhalation. Therefore, the NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant labels specify that seed treatment workers must wear coveralls over a long-sleeved shirt and long pants, chemical resistant gloves, socks and shoes and a respirator. In addition, cleaners must also wear chemical resistant coveralls. Closed transfer is required for treating seeds in commercial seed treatment facilities and for mobile treaters.

Seed treatment workers must wear the coveralls and use a respirator, as these products are co-formulations with clothianidin and metalaxyl, and this personal protective equipment (PPE) is required by the existing registered use patterns for these actives. Taking into consideration the label statements and the expectation of the exposure period for handlers and workers, the health risk to these individuals are not a concern.

When treating seed with Metlock Fungicide, the label specifies that seed treatment workers must wear long-sleeved shirt, long pants, chemical resistant gloves, socks and shoes. When commercially treating wheat seed with Metlock Fungicide, workers must also wear a respirator. In addition, workers cleaning treating equipment must wear chemical resistant coveralls over the long-sleeved shirt and long pants. Closed transfer is required for treating seeds in commercial seed treatment facilities and for mobile treaters.

The Metlock Fungicide and NipsIt SUITE Cereals OF Seed Protectant labels specify that workers must wear long sleeved shirt, long pants, and protective gloves when handling treated seed. Workers must also use a closed cab planter when planting treated wheat.

For bystanders, exposure is expected to be much less than that for workers and is considered negligible. Therefore, health risks to bystanders are not of concern.

Environmental Considerations

What Happens When Metconazole Is Introduced Into the Environment?

Metconazole is toxic to non-target terrestrial plants and aquatic organisms. It is persistent in soil and aquatic sediment; however, it is not persistent in water. Metconazole is a potential leacher and may reach groundwater. Label instructions, including labelling of treated seed, are required.

Metconazole enters the environment when used as a seed-treatment fungicide for agricultural crops including wheat, corn, canola, rapeseed, and carinata. Metconazole breaks down relatively slowly in the terrestrial environment. It does not break down by reacting with light or water, but in the presence of microorganisms it can break down in both aquatic and terrestrial environments. Metconazole dissolves readily in water and has the potential to move through soil and may enter groundwater. Metconazole is unlikely to enter the atmosphere and be transported to areas far removed from where it was applied. Specific instructions to prevent carryover, groundwater contamination and runoff into aquatic habitats are provided on the end-use product labels.

Metconazole presents a negligible risk to terrestrial invertebrates including earthworms and bees, terrestrial vertebrates including small wild mammals and birds, aquatic invertebrates, freshwater algae, marine fish and marine algae. However, it may adversely affect non-target terrestrial plants, amphibians, freshwater fish and freshwater vascular plants. Therefore, hazard statements regarding the toxicity to non-target terrestrial plants and aquatic organisms are specified on the product labels.

Value Considerations

What Is the Value of Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant?

These three seed treatment products provide early season control or suppression of seed- and soil-borne fungi and insects.

Metlock Fungicide protects the seedling from seed rot, damping off, and/or root rot, as well as seed-borne pathogens in canola, rapeseed, carinata, corn and wheat.

NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant are seed applied combinations of two systemic fungicides and a systemic insecticide for broad spectrum control of early-season seed- and soil-borne diseases on canola, rapeseed, carinata, and wheat, as well as suppression or control of wireworms on wheat and flea beetles on canola.

Measures to Minimize Risk

Labels of registered pesticide products include specific instructions for use. Directions include risk-reduction measures to protect human and environmental health. These directions must be followed by law.

The key risk-reduction measures being proposed on the label of Metlock Fungicide, Nipslt SUITE Cereals of Seed Protectant and Nipslt SUITE Canola Seed Protectant to address the potential risks identified in this assessment are as follows.

Key Risk-Reduction Measures

Human Health

Because there is a concern with users coming into direct contact with metconazole on the skin or through inhalation of spray mists, anyone treating seeds with Metlock Fungicide or handling treated seeds must wear long-sleeved shirt and long pants, chemical resistant gloves, socks and shoes. When commercially treating wheat seed, workers must also wear a respirator. In addition, cleaners involved with commercial seed treatment must also wear chemical resistant coveralls over the long-sleeved shirt and long pants. Closed transfer is required for treating seeds in commercial seed treatment facilities and for mobile treaters. When planting treated seed, workers must wear long sleeved shirt, long pants, and protective gloves when handling seed. Workers must also use a closed cab planter when planting treated wheat.

For Nipslt SUITE Cereals of Seed Protectant and Nipslt SUITE Canola Seed Protectant, workers treating seed must wear coveralls over a long-sleeved shirt and long pants, chemical resistant gloves, socks and shoes and a respirator. In addition, cleaners must also wear chemical resistant coveralls. Closed transfer is required for treating seeds in commercial seed treatment facilities and for mobile treaters. For Nipslt SUITE Cereals of Seed Protectant, workers must wear a long-sleeve shirt, long pants and protective gloves when handling treated seed and use a closed cab planter when planting treated wheat.

Environment

For metconazole, the currently registered foliar application rates are in the range of 182.4 to 560 g a.i./ha/season while the proposed seed treatment rates are in the range of 0.09 to 1.65 g a.i./ha/season. Therefore, the existing risk mitigation measures required for foliar application are adequate for the proposed use for seed treatment in commercial and on-farm treatment facilities.

The two end-use products, Nipslt SUITE Cereals of Seed Protectant and Nipslt SUITE Canola Seed Protectant, are co-formulated with clothianidin; thus, label statements to reduce risk to pollinators from treated seed are required. No additional precautionary label statements are required for Metlock Fungicide.

Next Steps

Before making a final registration decision on metconazole, the PMRA will consider all comments received from the public in response to this consultation document. The PMRA will accept written comments on this proposal up to 45 days from the date of publication of this document. Please note that, to comply with Canada's international trade obligations, consultation on the proposed MRLs will also be conducted internationally via a notification to the World Trade Organization. Please forward all comments to Publications (contact information on the cover page of this document). The PMRA will then publish a Registration Decision, which will include its decision, the reasons for it, a summary of comments received on the proposed final decision and the Agency's response to these comments.

Other Information

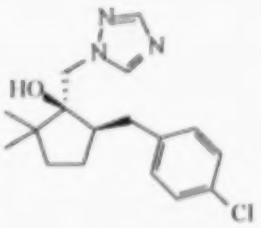
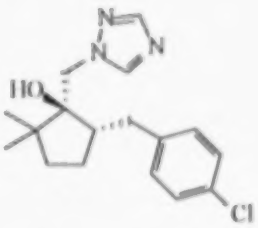
When the PMRA makes its registration decision, it will publish a Registration Decision on metconazole (based on the Science Evaluation of this consultation document). In addition, the test data referenced in this consultation document will be available for public inspection, upon application, in the PMRA's Reading Room (located in Ottawa).

Science Evaluation

Metconazole

1.0 The Active Ingredient, Its Properties and Uses

1.1 Identity of the Active Ingredient

Active substance	Metconazole
Function	Fungicide
Chemical name	
1. **International Union of Pure and Applied Chemistry (IUPAC)**	(1*RS*,5*RS*;1*RS*,5*SR*)-5-(4-chlorobenzyl)-2,2-dimethyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
2. **Chemical Abstracts Service (CAS)**	5-[(4-chlorophenyl)methyl]-2,2-dimethyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS number	125116-23-6
Molecular formula	$C_{17}H_{22}ClN_3O$
Molecular weight	319.83
Structural formula	 cis-metconazole (1RS,5RS)  trans-metconazole (1RS,5SR)
Purity of the active ingredient	97.0% nominal

1.2 Physical and Chemical Properties of the Active Ingredients and End-use Product

Technical Product— Metconazole Fungicide Technical

Property	Result
Colour and physical state	White solid
Odour	Odourless
Melting range	100.0–108.4°C
Boiling point or range	N/A
Density	1.14
Vapour pressure at 20°C	Analyte — Vapour pressure (Pa) AI — $< 1.23 \times 10^{-5}$ cis-isomer — $< 1.04 \times 10^{-5}$ trans-isomer — 1.96×10^{-6}
Ultraviolet (UV)-visible spectrum	λ_{max} = 221.4 nm
Solubility in water at 20°C	Analyte — Solubility (µg/mL) AI — 30.4 cis-isomer — 17.1 trans-isomer — 13.6
Solubility in organic solvents at 20°C (g/L)	Solvent — AI — cis — trans dichloromethane — 481 — 343 — 141 methanol — 403 — 291 — 117 acetone — 363 — 251 — 117 ethyl acetate — 260 — 173 — 90 2-propanol — 132 — 87 — 47 toluene — 103 — 66 — 38 hexane — 1.4 — 0.93 — 0.48
n-Octanol-water partition coefficient (K_{ow})	K_{ow} — $\log K_{ow}$ AI — 7090 ± 989 — 3.85 cis — 7150 ± 803 — 3.85 trans — 6800 ± 1700 — 3.8
Dissociation constant (pK_a)	pK_{a1} = 11.38 ± 0.03 pK_{a2} = 1.06 ± 0.03

Property	Result
Stability (temperature, metal)	The product was found to be stable in the presence of metals in their natural state (aluminum and iron) and their ionic form (aluminum acetate and iron acetate) at normal and elevated temperature (25 ± 2°C and 54 ± 2°C, respectively).

End-use Product—Metlock Fungicide

Property	Result
Colour	Opaque white
Odour	slight sweet
Physical state	liquid
Formulation type	SU (Suspension)
Guarantee	Metconazole 443 g/L
Container material and description	Plastic jugs or totes, metal jug, tote or drum, HDPE bottles
Density	1.10–1.14 g/mL
pH of 1% dispersion in water	5.33
Oxidizing or reducing action	The product does not react with monoammonium phosphate, water, granular zinc (a reducing agent) or 1% aqueous potassium permanganate (an oxidizing agent).
Storage stability	The product is stable for 12 months when stored in commercial packaging under warehouse conditions.
Corrosion characteristics	No signs of corrosion during 12 months storage in commercial containers
Explodability	The product does not contain explosive ingredients

End-use Product— NipsIt SUITE Cereals OF Seed Protectant

Property	Result
Colour	Red
Odour	paint odour
Physical state	Opaque liquid
Formulation type	SU (Suspension)
Guarantee	Clothianidin 30.7 g/L Metalaxyl 9.24 g/L Metconazole 4.62 g/L
Container material and description	Plastic jugs or totes, HDPE bottles

Property	Result
Density	1.03–1.07 g/mL
pH of 1% dispersion in water	5.94
Oxidizing or reducing action	No reaction is expected with monoammonium phosphate, water, granular zinc (a reducing agent) or 1% aqueous potassium permanganate (an oxidizing agent).
Storage stability	The product is stable for 12 months when stored in commercial packaging under warehouse conditions.
Corrosion characteristics	No signs of corrosion during 12 months storage in commercial containers
Explodability	The product does not contain explosive ingredients

End-use Product— NipsIt SUITE Canola Seed Protectant

Property	Result
Colour	Blue
Odour	Faint latex paint odour
Physical state	Viscous liquid
Formulation type	SU (Suspension)
Guarantee	Clothianidin 279 g/L Metalaxyl 5.23 g/L Metconazole 1.04 g/L
Container material and description	Plastic jugs or totes, HDPE bottles
Density	1.21–1.31 g/mL
pH of 1% dispersion in water	7.4
Oxidizing or reducing action	No reaction is expected with monoammonium phosphate, water, granular zinc (a reducing agent) or 1% aqueous potassium permanganate (an oxidizing agent).
Storage stability	The product is stable for 12 months when stored in commercial packaging under warehouse conditions.
Corrosion characteristics	No signs of corrosion during 12 months storage in commercial containers
Explodability	The product does not contain explosive ingredients

1.3 Directions for Use

Metlock Fungicide may be applied to canola, rapeseed, and carinata seed at a rate of 3.4 mL/100 kg seed and to corn seed at a rate of 2.8–5.7 mL/100 kg seed using commercial seed treatment facilities. Wheat seed can be treated at a rate of 3.4 mL/100 kg seed using commercial or on-farm facilities. An appropriate colourant must be added when this product is applied (blue for oilseeds, red for grain seeds).

NipsIt SUITE Cereals OF Seed Protectant may be applied to wheat seed at a rate of 326 mL/100 kg seed using commercial and on-farm seed treatment facilities. The formulation includes a red colourant, so no additional colourant is required.

NipsIt SUITE Canola Seed Protectant may be applied to canola, rapeseed and carinata seed at a rate of 1.43 L/100 kg seed using commercial seed treatment facilities. The formulation includes a blue colourant, so no additional colourant is required.

1.4 Mode of Action

Metconazole is a triazole fungicide that interferes with normal fungal cell wall development by inhibiting sterol biosynthesis. Metconazole is classified as a Group 3 fungicide by the Fungicide Resistance Action Committee (FRAC).

2.0 Methods of Analysis

2.1 Methods for Analysis of the Active Ingredient

The methods provided for the analysis of the active ingredient and the impurities in Metconazole Fungicide Technical have been validated and assessed to be acceptable for the determinations.

2.2 Method for Formulation Analysis

The methods provided for the analysis of the active ingredients in the formulations have been validated and assessed to be acceptable for use as enforcement analytical methods.

2.3 Methods for Residue Analysis

The methods previously provided for residue analysis in soil, sediment and water were assessed to be acceptable for data generation and enforcement purposes.

Refer to Evaluation Report ERC2011-02, *Metconazole* for the analytical methods on metconazole residues in plant and animal matrices for data generation purposes. Refer to the Evaluation Report for application number 2010-2902 for the analytical methods on metconazole residues in plant matrices for enforcement and confirmatory purposes.

3.0 Impact on Human and Animal Health

3.1 Toxicology Summary

A detailed review of the toxicological database for metconazole was conducted in 2007 and published in ERC2011-02, *Metconazole* and further information was reviewed and published in the Proposed Registration Decision PRD2013-11, *Metconazole*. The studies were carried out in accordance with currently accepted international testing protocols and good laboratory procedures. The scientific quality of the data is high and the database is considered adequate to define the majority of the toxic effects that may result from exposure to metconazole.

Results of the acute toxicology studies conducted on laboratory animals with Metlock Fungicide, Nipslt SUITE Cereals OF Seed Protectant and Nipslt SUITE Canola Seed Protectant are summarized in Appendix I, Table 1. For the toxicology endpoints for use in the human health risk assessment please refer to Appendix I, Table 2.

Incident Reports

Since 26 April 2007, registrants have been required by law to report incidents, including adverse effects to health and the environment, to the PMRA. Information on the reporting of incidents can be found on the Pesticides and Pest Management portion of Health Canada's website. Incidents were searched and reviewed for the active ingredient metconazole. As of 21 February 2014, the PMRA had received seven human and one domestic animal incident report involving metconazole.

Exposure to metconazole occurred either via drift from the application site, during application activities or through contact with a treated area. The symptoms reported in four of the incidents (classified as moderate) and those reported in three incidents (classified as minor) were determined to have some degree of association with the reported exposure. The effects noted in these reports were eye irritation, pain, itchy skin, hives, erythema, rash and nausea. These human incident reports were considered in this evaluation and did not affect the assessment.

3.1.1 Pest Control Procucts Act Hazard Characterization

Refer to PRD2013-11, *Metconazole* for *Pest Control Products Act* Hazard Characterization.

3.2 Acute Reference Dose (ARfD) and Acceptable Daily Intake (ADI)

Refer to ERC2011-02, *Metconazole* for the acute reference dose, acceptable daily intake and cancer assessment of metconazole.

3.3 Occupational and Residential Risk Assessment

3.3.1 Toxicological Endpoints

Refer to PRD2013-11, *Metconazole* for the short-, intermediate- and long-term dermal and inhalation toxicological endpoints, as well as the dermal absorption toxicological endpoints.

3.3.2 Occupational Exposure and Risk

Corn, rapeseed, canola, carinata, and/or wheat can be treated with either Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant in commercial seed treatment facilities and by commercial mobile treaters, and planted using conventional seeding equipment. Wheat can also be treated with either Metlock Fungicide or NipsIt SUITE Cereals OF Seed Protectant on-farm and planted using conventional seeding equipment.

A seed treatment dust-off study was conducted to compare the dust-off potential of seeds treated with either Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant, with the dust-off potential of the seeds treated with other formulations that support the use of the surrogate study data. Seed treatment dust level evaluation (dust-off) experiments were conducted for untreated and treated canola, corn and wheat seeds. The study report concluded that dust-off potential of Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant treated canola, corn and wheat seed are generally equal to or lower than that from surrogate test material-treated crops. Therefore, the surrogate seed treating and planting studies should not underestimate exposure while treating or planting metconazole treated corn, canola or wheat. Since rapeseed and carinata seed are similar in morphology as canola seed, exposure from the use of all the proposed oilseeds is expected to be similar.

3.3.2.1 Commercial Seed Treatment Exposure and Risk Assessment

Individuals can potentially be exposed to metconazole while treating seed in commercial seed treatment facilities and by commercial mobile treaters. Chemical specific data for assessing human exposure during commercial seed treatment were not submitted. As such, surrogate exposure data were used to estimate risk to workers in commercial seed treatment settings.

Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, and NipsIt SUITE Canola Seed Protectant are for use by commercial seed treaters for treating corn, canola, rapeseed, carinata and/or wheat seeds. Worker exposure was assessed for treating seed with closed transfer systems only.

For assessing exposure during seed treatment in commercial operations, a surrogate passive dosimetry study measuring the exposure of mixers/loaders/calibrators (treaters), baggers/sewers/stackers and cleaners at eleven small to large commercial facilities treating cereal seed with Jockey Fungicide was used. Thirty seven trials were conducted with mixers, loaders, calibrators (seven operators) and baggers (22 operators) wearing a single layer and gloves, and

cleaners (eight operators) wearing coveralls over a single layer and gloves. Dermal exposure for each worker was measured by passive dosimetry using a combination of an inner whole body dosimeter, hand rinses, and face/neck wipes. Inhalation exposure for each worker was measured by means of a personal air sampling pump. Exposure values for treaters and baggers were normalized for the amount of active ingredient handled. Exposure values for cleaners were normalized to the application rate. The arithmetic mean was used for all activities since there were an adequate number of replicates and the recoveries were sufficient.

Commercial seed treating capacities were derived using the PMRA commercial default throughput values. The default amount of corn (125,000 kg), canola (67,000 kg) and wheat (92,000 kg) seed treated per day were used to estimate exposure on a typical eight hour work day.

Table 3.3.2.1.1 presents the non-cancer risk estimates for the commercial seed treatment of canola, corn, and wheat seeds with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant. The calculated margins of exposure (MOEs) were above the target MOE of 1000. No occupational non-cancer risks of concern were identified for metconazole exposure from treating corn, canola, rapeseed, carinata or wheat seeds commercially with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant in closed transfer commercial facilities when workers wear the personal protective equipment (PPE) worn in the surrogate study.

Table 3.3.2.1.1 Exposure and Risk Estimates for Workers in Commercial Seed Treatment Facilities Applying Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant

Corn (field, sweet, popcorn)						
Scenario		**Unit Exposure**		**Exposure[2] (mg/kg bw/day)**		**MOE[3,4]**
		Dermal	**Inhalation**	**Dermal[3]**	**Inhalation**	**Combined**
Single layer, gloves	**kg a.i. handled/day[1]**	**µg/kg a.i. handled**				
Treater	3.16	0.88	0.016	3.47×10^{-5}	6.31×10^{-7}	678,900
Bagger/Sewer/ Stacker		17.67	0.89	6.97×10^{-4}	3.51×10^{-5}	24,500
Coveralls over single layer, gloves	**g a.i./100 kg seed**	**µg/g a.i./100 kg seed**				
Cleaner[5]	2.5	18.46	0.64	5.77×10^{-4}	2.00×10^{-5}	34,200
Cleaner + Treater[6]		N/A	N/A	6.12×10^{-4}	2.06×10^{-5}	32,600
Canola						
Scenario		**Unit Exposure**		**Exposure[2] (mg/kg bw/day)**		**MOE[3,4]**
		Dermal	**Inhalation**	**Dermal[3]**	**Inhalation**	**Combined**
Single layer, gloves	**kg a.i. handled/day[1]**	**µg/kg a.i. handled**				
Treater	1.01	0.88	0.016	1.12×10^{-5}	2.02×10^{-7}	2,118,100
Bagger/Sewer/ Stacker		17.67	0.89	2.23×10^{-4}	1.13×10^{-5}	76,500

Corn (field, sweet, popcorn)						
Scenario		**Unit Exposure**		**Exposure[2] (mg/kg bw/day)**		**MOE[3,4]**
		Dermal	**Inhalation**	**Dermal[3]**	**Inhalation**	**Combined**
Coveralls over single layer, gloves	**g a.i./100 kg seed**	**µg/g a.i./100 kg seed**				
Cleaner[5]	1.5	18.46	0.64	3.48×10^{-4}	1.21×10^{-5}	56600
Cleaner + Treater[6]		N/A	N/A	3.60×10^{-4}	1.23×10^{-5}	55200
Wheat						
Scenario		**Unit Exposure**		**Exposure[2] (mg/kg bw/day)**		**MOE[3,4]**
		Dermal	**Inhalation**	**Dermal**	**Inhalation**	**Combined**
Single layer, gloves	**kg a.i. handled/day[1]**	**µg/kg a.i. handled**				
Treater	1.39	0.88	0.016	1.53×10^{-5}	2.78×10^{-7}	1,542,500
Bagger/Sewer/ Stacker		17.67	0.89	3.07×10^{-4}	1.55×10^{-5}	55,600
Coveralls over single layer, gloves	**g a.i./100 kg seed**	**µg/g a.i./100 kg seed**				
Cleaner[5]	1.5	18.46	0.64	3.48×10^{-4}	1.21×10^{-5}	56600
Cleaner + Treater[6]		N/A	N/A	3.64×10^{-4}	1.24×10^{-5}	54600

[1] kg a.i. handled per day = kg seed treated per day × application rate (kg a.i./kg seed).

[2] For treater and bagger/sewer/stackers:

$$\text{Exposure (mg/kg bw/day)} = \frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$$

[3] Dermal NOAEL = 30 mg/kg bw/day for short- to intermediate term durations
Inhalation NOAEL = 2 mg/kg bw/day for short- to intermediate term durations

[4] Dermal and inhalation MOEs were combined due to identical effects; target MOE= 1000

[5] For cleaning personnel, unit exposures are normalized for application rate (the highest application rate proposed was used) therefore:

$$\text{Exposure (mg/kg bw/day)} = \frac{\text{Unit exposure (µg a.i./g a.i./100 kg seed)} \times \text{application rate (g a.i./100 kg seed)}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$$

[6] Cleaner task was < 1 hour per day; therefore, it was assumed other tasks such as treating may be performed.

A cancer quotient (Q_1^*) was identified and, therefore, a cancer risk assessment was required for occupational exposure. Cancer risk is estimated by extrapolating the average daily dose (ADD) over an average lifetime worked to obtain a lifetime average daily dose (LADD). The LADD is compared to the cancer risk quotient to determine the cancer risk. The cancer risk assessment for corn is shown, as it represents the highest exposure per day of the proposed seeds and has the longest commercial treating period per year of the proposed crops. Individuals are expected to work a maximum of 206 days per year (maximum amount for corn) and may work up to 40 years in a commercial facility. A risk below 1×10^{-5} is generally considered acceptable in worker populations.

Table 3.3.2.1.2 presents the cancer risk estimates for the commercial seed treatment of corn seeds with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant. No cancer risks of concern were identified for metconazole exposure from commercial treating of corn, canola, rapeseed, carinata and wheat seeds with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant.

Table 3.3.2.1.2: Cancer Risk Estimates for Workers in Commercial Seed Treatment Facilities Applying Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant

Corn							
Scenario		**Unit Exposure**		**ADD [2, 4] (mg/kg bw/day)**		**LADD[6] (mg/kg bw/day)**	**Cancer Risk[7]**
		Dermal	**Inhalation**	**Dermal[3]**	**Inhalation**		
Single layer, gloves	**kg a.i. handled/ day[1]**	**µg/kg a.i. handled**					
Treater/ Applicator	3.16	0.88	0.016	7.3×10^{-6}	6.32×10^{-7}	2.30×10^{-6}	2×10^{-8}
Bagger/Sewer/ Stacker		17.67	0.89	1.47×10^{-4}	3.52×10^{-5}	5.26×10^{-5}	4×10^{-7}
Coveralls over single layer, gloves	**g a.i./100 kg seed**	**µg/g a.i./100 kg seed**					
Cleaner	2.5	18.46	0.64	1.21×10^{-4}	2.00×10^{-5}	4.09×10^{-5}	3×10^{-7}
Cleaner + Treater [5]		N/A	N/A	1.28×10^{-4}	2.06×10^{-5}	4.31×10^{-5}	3×10^{-7}

[1] kg a.i. handled per day = kg seed treated per day × application rate (kg a.i./kg seed).

[2] For treater/applicators and bagger/sewer/stackers:

$$\text{(ADD) (mg/kg bw/day)} = \frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$$

[3] Dermal exposure adjusted for 21% dermal absorption

[4] For cleaning personnel, unit exposures are normalized for application rate (the highest application rate proposed was used) therefore:

$$\text{ADD (mg/kg bw/day)} = \frac{\text{Unit exposure (µg a.i./g a.i./100 kg seed)} \times \text{application rate (g a.i./100 kg seed)}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$$

[5] Cleaner task was < 1 hour per day, therefore, it was assumed other tasks such as treating may be performed.

[6] $\text{LADD (mg/kg bw/day)} = \frac{\text{ADD} \times \text{days of exposure per year} \times 40 \text{ years of exposure}}{365 \text{ days} \times 78 \text{ years}}$

[7] Cancer risk = LADD × Q_1^*; Q_1^* = 0.008 $(\text{mg/kg bw/day})^{-1}$

3.3.2.2 On-Farm Seed Treatment Exposure and Risk Assessment

Individuals can potentially be exposed to metconazole while treating wheat seed on-farm. Chemical specific data for assessing human exposure during on-farm seed treatment were not submitted. As such, surrogate exposure data were used to estimate risk to workers treating seed on-farm.

Metlock Fungicide and Nipslt SUITE Cereals OF Seed Protectant are intended for use with on-farm seed treaters for treating wheat seed. Worker exposure was assessed for treating seed with open transfer systems.

For assessing exposure during seed treatment at on-farm operations, a previously reviewed surrogate passive dosimetry study measuring the exposure of treaters, baggers and cleaners on-farm treating cereal seed was used. Twelve workers were monitored during mixing, loading, applying, bagging and cleaning tasks while wearing a single layer and gloves. Dermal exposure for each worker was measured by passive dosimetry using a combination of an inner whole body dosimeter, hand rinses, and face/neck wipes. Inhalation exposure for each worker was measured by means of a personal air sampling pump. Exposure values were normalized for the amount of active ingredient handled per day. The 90th percentile was used for all activities since replicate numbers and field recoveries were low.

The on-farm seed treating throughput for wheat seed was derived using the PMRA default value (13,500 kg seed/day) and was used to estimate exposure on a typical eight hour work day.

Table 3.3.2.2.1 presents the non-cancer risk estimates for the on-farm seed treatment of wheat seeds with Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant. The calculated MOEs were above the target MOE of 1000. No occupational non-cancer risks of concern were identified for metconazole exposure from treating wheat seeds on-farm with Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant with open transfer equipment when workers wear the PPE worn in the surrogate study.

Table 3.3.2.2.1: Exposure and Risk Estimates for Workers Treating Seed With Metlock Fungicide or Nipslt Suite Cereals OF Seed Protectant On-Farm

Crop	Amount handled[1] (kg a.i./day)	Unit Exposure (ug/kg a.i. handled)		Exposure[2] (mg/kg bw/day)		MOE [3,4]
		Dermal	Inhalation	Dermal[3]	Inhalation	
Wheat	0.205	142	7.83	3.64×10^{-4}	2.01×10^{-5}	45,100

[1] kg a.i. handled per day = kg seed treated per day × application rate (kg a.i./kg seed).

[2] Exposure (mg/kg bw/day) = $\frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$

[3] Dermal NOAEL = 30 mg/kg bw/day for short- to intermediate term durations
Inhalation NOAEL = 2 mg/kg bw/day for short- to intermediate term durations

[4] Dermal and inhalation MOEs were combined due to identical effects; target MOE= 1000

As in the commercial assessment, a cancer risk assessment was required for on-farm seed treatment. Individuals are expected to perform this task a maximum of 10 days per year and may work up to 40 years. A risk below 1×10^{-5} is generally considered acceptable in worker populations. No cancer risks of concern were identified for metconazole exposure from on-farm treating of wheat seeds with Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant.

Table 3.3.2.2.2: Cancer Risk Estimates for Workers Treating Seed With Metlock Fungicide or NipsIt SUITE Cereals OF Seed Protectant On-Farm

Crop	Amount handled[1] (kg a.i./day)	Unit Exposure (ug/kg a.i. handled)		ADD[2] (mg/kg bw/day)		LADD[4] (mg/kg bw/day)	Cancer Risk[5]
		Dermal	Inhalation	Dermal[3]	Inhalation		
Wheat	0.205	142	7.83	7.66×10^{-5}	2.01×10^{-6}	1.36×10^{-6}	1×10^{-9}

[1] kg a.i. handled per day = kg seed treated per day × application rate (kg a.i./kg seed).

[2] ADD (mg/kg bw/day) = $\frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$

[3] Dermal exposure adjusted for 21% dermal absorption.

[4] LADD (mg/kg bw/day) = $\frac{\text{ADD} \times 10 \text{ days of exposure per year} \times \text{years of exposure}}{365 \text{ days} \times 78 \text{ years}}$

[5] Cancer risk = LADD × Q_1*; Q_1* = 0.008 (mg/kg bw/day)$^{-1}$

3.3.2.3 Planting Exposure and Risk Assessment

Individuals can be potentially exposed to metconazole while planting treated seed. Chemical specific data for assessing human exposure during planting of treated seed were not submitted. As such, surrogate exposure data were used to estimate risk to workers planting treated seed.

Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant treated corn, canola, rapeseed, carinata and wheat seeds may be planted on farms in Canada. Worker exposure was assessed for planting metconazole treated seed with a closed cab planter.

For assessing exposure during planting metconazole treated seeds, a previously reviewed surrogate passive dosimetry study that measured the exposure of workers loading and planting treated seed was used. Sixteen workers were monitored while opening bags, loading seed into a hopper and planting seeds (closed-cab), cleanup and repair while wearing a single layer and gloves. Dermal exposure for each worker was measured by passive dosimetry using a combination of an inner whole body dosimeter, hand rinses, and face/neck wipes. Inhalation exposure for each worker was measured by means of a personal air sampling pump. Exposure values were normalized for the amount of active ingredient handled per day. The arithmetic mean was used for all activities as replicate numbers and field recoveries were sufficient.

Seed planting capacities for corn, canola and wheat seeds were derived using the PMRA default values: 13,500 kg seed/day for wheat, 600 kg seed/day for canola and 1,350 kg seed/day for corn.

Table 3.3.2.3.1 presents the non-cancer risk estimates for the planting of metconazole treated corn, canola and wheat seeds. The calculated MOEs were above the target MOE of 1000. No occupational non-cancer risks of concern were identified for metconazole exposure for planting seeds treated with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant when workers wear the PPE worn in the surrogate study.

Table 3.3.2.3.1: Exposure and Risk Estimates for Planting Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant Treated Seed

Scenario	Unit Exposure (µg/kg a.i. handled)		kg seed planted per day	App. Rate (kg a.i./kg seed)	kg a.i. handled per day[1]	Exposure[2] (mg/kg bw/day)		MOE [3,4]
	Dermal	Inhalation				Dermal[3]	Inhalation	Combined
Corn	1515	82.83	1,350	0.000025	0.034	6.50×10^{-4}	3.56×10^{-5}	25,300
Canola	1515	82.83	600	0.000015	0.009	1.72×10^{-4}	9.42×10^{-6}	96,100
Wheat	1515	82.83	13,500	0.000015	0.205	3.89×10^{-3}	2.13×10^{-4}	4,240

[1] kg a.i. handled per day = kg seed planted per day × application rate (kg a.i./kg seed).

[2] Exposure (mg/kg bw/day) = $\frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$

[3] Dermal NOAEL = 30 mg/kg bw/day for short- to intermediate term durations
Inhalation NOAEL = 2 mg/kg bw/day for short- to intermediate term durations

[4] Dermal and inhalation MOEs were combined due to identical effects; target MOE= 1000

A cancer risk assessment was required for planting treated seed. Individuals are expected to plant seed for 10 days per year typically and may work for 40 years on a farm. A risk below 1×10^{-5} is generally considered acceptable in worker populations. No cancer risks of concern were identified for metconazole exposure from planting seeds treated with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant (Table 3.3.2.3.2).

Table 3.3.2.3.2: Cancer Risk Estimates for Workers Planting Seed Treated With Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant

Crop	Amount handled[1] (kg a.i./day)	Unit Exposure (µg/kg a.i. handled)		ADD[2] (mg/kg bw/day)		LADD[4] (mg/kg bw/day)	Cancer Risk[5]
		Dermal	Inhalation	Dermal[3]	Inhalation		
Corn	0.034	1515	82.83	1.37×10^{-4}	3.53×10^{-5}	2.40×10^{-6}	2×10^{-9}
Canola	0.045	1515	82.83	3.60×10^{-5}	9.38×10^{-6}	6.38×10^{-6}	5×10^{-10}
Wheat	0.205	1515	82.83	8.17×10^{-4}	2.13×10^{-4}	1.45×10^{-5}	1×10^{-8}

[1] kg a.i. handled per day = kg seed treated per day × application rate (kg a.i./kg seed).

[2] ADD (mg/kg bw/day) = $\frac{\text{Unit exposure (µg/kg a.i. handled per day)} \times \text{kg a.i. handled per day}}{80 \text{ kg bw} \times 1000 \text{ µg/mg}}$

[3] Dermal exposure adjusted for 21% dermal absorption.

[4] LADD (mg/kg bw/day) = $\frac{\text{ADD} \times 10 \text{ days of exposure per year} \times 40 \text{ years of exposure}}{365 \text{ days} \times 78 \text{ years}}$

[5] Cancer risk = LADD × Q_1*; Q_1* = 0.008 (mg/kg bw/day)$^{-1}$

Considering the high MOEs and low cancer risk estimates, as well as the difference in dust off of the surrogate study seed and proposed seed, it is expected that the risk from planting Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant treated canola and corn seed in open cab tractors is not of concern. However, for planting treated wheat seed, the calculated MOE was not excessive relative to target MOE; as such, the requirement for closed cab planting remains for this use.

3.3.2.4 On-Farm Treating and Planting Exposure and Risk Assessment

Individuals can be potentially exposed to metconazole while treating seeds on-farm with subsequent planting of the treated seed in a single day.

Metlock Fungicide and Nipslt SUITE Cereals OF Seed Protectant are proposed for on-farm use with wheat seeds. As such, farmers are able to treat and plant treated seed in a single day. Exposures from on-farm treating (Table 3.3.2.2.1) were combined with exposures from planting (Table 3.3.2.3.1). Calculated MOEs were above the target MOE of 1000 (Table 3.3.2.4.1). No risks of concern were identified for metconazole exposure from on-farm treating and planting of wheat seeds treated with Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant.

Table 3.3.2.4.1: Risk Estimates for Farmers Treating and Planting Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant Treated Wheat Seed

Crop	On-Farm Exposure (mg/kg bw/day)		Planting Exposure (mg/kg bw/day)		MOE[1,2]
	Dermal	Inhalation	Dermal	Inhalation	
Wheat	3.64×10^{-4}	2.01×10^{-3}	3.89×10^{-3}	2.13×10^{-3}	3,900

[1] Dermal NOAEL = 30 mg/kg bw/day for short- to intermediate term durations
Inhalation NOAEL = 2 mg/kg bw/day for short- to intermediate term durations
[2] Dermal and inhalation MOEs were combined due to identical effects; target MOE= 1000

Average daily doses from on-farm treating (Table 3.4.2.2.2) were combined with ADDs from planting (Table 3.3.2.3.2). The combined on-farm treating and planting lifetime average daily dose was calculated to determine the cancer risk. Individuals who treat and plant on-farm are expected to do this activity for approximately 10 days per year typically and may work for up to 40 years. A risk below 1×10^{-5} is generally considered acceptable in worker populations. No cancer risks of concern were identified for metconazole exposure from on-farm treating and planting Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant treated wheat seeds (Table 3.3.2.4.2).

Table 3.3.2.4.2: Cancer Risk Estimates for Farmers Treating and Planting Metlock Fungicide or Nipslt SUITE Cereals OF Seed Protectant Treated Wheat Seed.

Crop	On-Farm ADD (mg/kg bw/day)		Planting ADD (mg/kg bw/day)		LADD[1] (mg/kg bw/day)	Cancer Risk[2]
	Dermal	Inhalation	Dermal	Inhalation		
Wheat	7.65×10^{-5}	2.01×10^{-5}	8.17×10^{-4}	2.13×10^{-4}	1.58×10^{-5}	1×10^{-6}

[1] LADD (mg/kg bw/day) = $\frac{\text{(on-farm ADD + planting ADD)} \times \text{10 days of exposure per year} \times \text{40 years of exposure}}{\text{365 days} \times \text{78 years}}$

[2] Cancer risk = LADD × Q_1*; Q_1* = 0.008 (mg/kg bw/day)$^{-1}$

3.3.3 Residential Exposure and Risk Assessment

Bystander exposure should be negligible since the potential for drift is expected to be minimal when planting treated seed.

3.4 Food Residues Exposure Assessment

3.4.1 Residues in Plant and Animal Foodstuffs

Metconazole is currently registered for foliar application on various crops including canola and wheat, but is not registered for use on corn. Refer to ERC2011-02, *Metconazole* for the residue definitions for risk assessment and enforcement purposes, for the field trial data on wheat from foliar applications, and for the freezer storage stability of metconazole in plant and animal foodstuffs, and to the Evaluation Reports for application numbers 2010-2906 and 2010-2909 for the field trial data on canola from foliar applications, and for the freezer storage stability of metconazole in plant foodstuffs. The information captured herein relates only to the seed treatment uses on canola, corn and wheat.

New metabolism and residue data were submitted for seed treatment use of metconazole on canola (rapeseed), corn and wheat. The results of the radiotracer study with treated wheat and corn seeds indicated no uptake of radioactive residues into corn commodities and wheat forage, and limited translocation into wheat hay, grain and straw. The residue definitions in plants remain unchanged from those established for foliar uses (ERC2011-02, *Metconazole*). Acceptable validation data were submitted for the confirmatory method RM-41C-4 in corn. Supervised residue trials conducted at the label rate in NAFTA representative regions with metconazole on wheat as a seed treatment indicated that residues of metconazole (*cis*- and *trans*-isomers) were non-quantifiable (<0.02 ppm) in/on wheat forage, hay, grain and straw. Based on foliar applications, maximum residue limits (MRLs) for metconazole were established at 0.15 ppm for wheat and at 0.08 ppm for Crop Subgroup 20A (Rapeseed subgroup). The seed treatment uses of metconazole on wheat and canola (rapeseed) at lower rates and longer pre-harvest intervals (PHIs) are not expected to result in residues exceeding the established MRLs. To support the use of metconazole as a seed treatment on corn, MRLs are proposed for metconazole at 0.04 ppm (limit of quantitation (LOQ) of the enforcement method) in sweet corn kernels plus cob with husk removed, field corn and popcorn grain. No changes are required to the MRLs established for metconazole in livestock commodities. There are no food or feed commodities associated with the use on carinata and rapeseed under the proposed labels.

3.4.2 Dietary Risk Assessment

Acute and chronic [(cancer and non-cancer)] dietary risk assessments were conducted using the Dietary Exposure Evaluation Model (DEEM–FCID™, Version 2.14), which uses updated food consumption data from the United States Department of Agriculture's Continuing Surveys of Food Intakes by Individuals, 1994–1996 and 1998. Refer to PRD2013-11, *Metconazole* for a summary of the assessment. An update was not required as a result of adding seed treatment uses.

3.4.3 Maximum Residue Limits

Please refer to the Maximum Residue Limit Database in the Pesticides and Pest Management section of Health Canada's website for the established MRLs for metconazole.

Table 3.4.3.1 Proposed Maximum Residue Limits

Commodity	Recommended MRL (ppm)
Field corn, popcorn grain, sweet corn kernels plus cob with husks removed	0.04

For additional information on MRLs in terms of the international situation and trade implications, refer to Appendix II.

The nature of the residues in animal and plant matrices, analytical methodology and residue trial data were assessed in evaluation report ERC2011-02, *Metconazole* and the Evaluation Reports for application numbers 2010-2906 and 2010-2909.

The radiotracer study, validation data for the confirmatory method RM-41C-4 in corn and the field trial data for wheat are in Appendix I, Tables 3 and 4.

4.0 Impact on the Environment

An environmental assessment was conducted for metconazole as its use as a seed treatment represents a major new use. An environmental risk assessment for metconazole use in foliar treatment products was conducted previously for non-target terrestrial and aquatic organisms and is reported in ERC2011-02, *Metconazole*.

4.1 Fate and Behaviour in the Environment

The properties of metconazole and its environmental behaviour have been thoroughly reviewed and characterized previously. Refer to ERC2011-02, *Metconazole* for details.

4.2 Environmental Risk Characterization

The environmental risk assessment integrates the environmental exposure and ecotoxicology information to estimate the potential for adverse effects on non-target species. This integration is achieved by comparing exposure concentrations with effects concentrations. As a seed treatment, metconazole can enter the environment through dislodging from treated seed surfaces during and after seeding. The potential for exposure to aquatic environments and non-target terrestrial plants via this application method is, however, considered to be reduced when compared to other forms of application (for example, broadcast spraying). The primary environmental concern for this risk assessment is for birds and small wild mammals as they may be exposed to metconazole through direct ingestion of treated seeds and for bees as metconazole may translocate within plants.

Risk to birds and small wild mammals

The general method for conducting the risk assessment to birds and small wild mammals is to, first, determine the amount of metconazole present on individual seeds based on the label application rate, and then to determine the amount of treated seeds required to be consumed to equal the appropriate toxicity endpoint (as a daily dose). Next, the number of seeds that are expected to be consumed by a generic-sized group of birds and mammals is calculated (using FIR of 5.1, 19.9, and 58.1 g diet/day, for 20, 100, and 1000 g birds, respectively, and 2.2, 4.5, and 68.7 g diet/day, for 15, 35, and 1000 g mammals, respectively). These values (representing the potential exposure) are then divided by the respective values for the amount of seeds required to be consumed [(equal to the toxicity endpoints; i.e. LD_{50} divided by 10, or no observed effect level (NOEL)] to calculate the risk quotients (RQ = exposure/toxicity).

The screening level risk assessment uses a conservative approach by assuming that the daily diet of birds and mammals consists of 100% treated seeds and that the seeds are treated at the proposed maximum application rate (2.5 g a.i./100 kg seeds for corn and 1.5 g a.i./100 kg seeds for canola, rapeseed, carinata and wheat). The LD_{50} and no observed effect concentration (NOEC) values of metconazole to birds and small wild mammals have previously been established (Table 19 of Appendix 1 in ERC2011-02, *Metconazole*) and was used for calculations of RQs.

At the screening level assessment, calculated risk quotients did not exceed the level of concern (LOC) for birds and small mammals (Appendix I, Table 5 and 6, respectively). Therefore, metconazole poses a negligible risk to birds and small mammals; no mitigation measures are required for metconazole use as a seed treatment product.

Risk to pollinators

The pollinator risk assessment for metconazole seed treatment is conducted according to the White Paper submitted to the FIFRA Scientific Advisory Panel in 2012. Metconazole is considered to be practically non-toxic to adult bees. The acute contact and oral LD_{50}s are determined to be >100 µg a.i./bee and 86 µg a.i./bee, respectively (Table 18, ERC2011-02, *Metconazole*). According to the White Paper, Tier I risk assessment for seed treatment through dietary exposure is assessed using RQ calculations, whereas any identified potential risks through contact exposure may be mitigated by best management practices without RQ calculation. The dietary exposure for metconazole seed treatment, assuming it can translocate within plants, is estimated with the default conservative EEC value of 1 mg/kg diet and the default food assumption value for adult bees of 0.292 g diet per bee per day. Comparing the dietary exposure with the oral toxicity endpoint, the RQ for the dietary exposure is calculated to be 0.003, less than the LOC (0.4). For the contact exposure, considering metconazole is practically non-toxicity to adult bees (>100 µg a.i./bee) and the low seed application rates (1.5-2.5 g a.i./100 kg seeds, equivalent to 0.09 and 1.65 g a.i./ha based on typical seeding rates), the risk of metconazole to adult bees via contact exposure is considered to be negligible. Therefore, the proposed seed treatment with metconazole fungicide is not expected to pose a risk to adult bees on both acute contact and oral basis.

Data to assess the risk of metconazole fungicide to bee larvae and adult bees on a chronic basis were not submitted. However, according to the mode of action of this chemical targeting on C^{14}-demethylase in sterol biosynthesis, the low acute toxicity to adult bees, and a lack of indication that metconazole may target developmental stages of bees, the risks for bee larvae and adults on a chronic basis resulting from the proposed seed treatment are expected to be low.

5.0 Value

5.1 Effectiveness Against Pests

5.1.1 Acceptable Efficacy Claims

5.1.1.1 Metlock Fungicide

A total of 56 field and greenhouse trials were submitted to support claims proposed for corn (22), wheat (19), and canola (15).

The trials reviewed on the soil pathogens *Fusarium* spp. and *Rhizoctonia solani* suggest that metconazole has efficacy against these pests as shown by stand counts, damping-off assessments and yield improvements in certain crops. Supported claims (seed rot, damping-off, etc.) were amended where necessary based on the assessment of the value data for each crop.

Control of common bunt was supported as proposed on wheat. The claim for *Cochliobolus sativus* was amended to suppression of common root rot as concluded from the provided data. Although loose smut trials on barley indicate good efficacy, confirmation of similar control of the pathogen affecting wheat (*Ustilago tritici*) is required.

The claim of suppression of seed-borne blackleg on canola was supported based on the performance of metconazole compared to the commercial standard. Extrapolation of claims from canola to rapeseed and *Brassica carinata* was also supported.

Other Group 3 fungicide seed treatment products are currently registered on wheat, corn, canola and rapeseed, some in combination with other fungicide and insecticide active ingredients. Registration of metconazole as a seed treatment on these crops provides growers with another disease management option.

5.1.1.2 NipsIt SUITE Cereals OF Seed Protectant

The proposed claims for seed and seedling diseases caused by *Fusarium* spp. and *Rhizoctonia solani*, common bunt and loose smut were reviewed in the submission to register Metlock Fungicide. Claims supported in that application were extrapolated to NipsIt SUITE Cereals OF Seed Protectant. Confirmatory value information requested for Metlock Fungicide are also requested for NipsIt SUITE Cereals OF Seed Protectant.

Claims proposed for control of seed and seedling diseases caused by *Pythium* spp. have been registered previously at a similar rate of metalaxyl. The claims were supported based on the current registration.

The use of NipsIt SUITE Cereals OF Seed Protectant was supported for suppression of wireworm feeding on wheat at an application rate of 326 mL/100 kg seed through extrapolation from efficacy data submitted to support the use of Nipsit Inside 600 Insecticide No loss of insecticidal activity was expected with the addition of the fungicides metalaxyl and metconazole.

As a combination product, NipsIt SUITE Cereals OF Seed Protectant offers broad-spectrum disease and insect control for wheat when applied at low rates. The formulation is suitable for on-farm application of fungicides plus an insecticide, which provides added convenience to the grower.

5.1.1.3 NipsIt SUITE Canola Seed Protectant

The proposed claims for seed and seedling diseases caused by *Fusarium* spp. and *Rhizoctonia solani*, and seed-borne blackleg were reviewed in the submission to register Metlock Fungicide. Claims supported in that submission were extrapolated to NipsIt SUITE Canola Seed Protectant.

Claims proposed for control of seed and seedling diseases caused by *Pythium* spp. have been registered previously at a similar rate of metalaxyl. The claims were supported based on the current registration.

The use of NipsIt SUITE Canola Seed Protectant was supported for early season control of flea beetles on canola and rapeseed at an application rate of 1.43 L/100 kg seed through extrapolation from the registered use pattern for clothianidin. No loss of insecticidal activity was expected with the addition of the fungicides metalaxyl and metconazole. Supported use claims on canola and rapeseed were extrapolated to *Brassica carinata* (carinata) based on the similarity in seed size and shape between canola, rapeseed and carinata.

As a combination product, NipsIt SUITE Canola Seed Protectant offers broad-spectrum disease and insect control for canola, rapeseed and carinata applied at low rates. The formulation is ready to use and requires no further dilution providing added convenience to the grower.

5.2 Economics

Wheat, canola and corn production are a vital part of Canadian agriculture. Although acreage has dropped over the past two years, wheat remains the number one crop in Canada, being planted on over 8,800,000 ha in 2011. Canola was planted on 7,500,000 ha and corn on 1,500,000 ha.

In a 2008 report from the Canola Council, it is estimated that canola production adds $13.8 billion in economic activity and plays a role in over 200,000 jobs. Multiple provincial websites recommend the use of fungicide and insecticide seed treatments for control of early season insects and pests.

Attack of tender seedlings by seed- and soil-borne pests can reduce plant stand and vigour. Ultimately, this can lead to reductions in grain and oilseed yield and quality resulting in economic losses to Canadian growers.

5.3 Sustainability

5.3.1 Survey of Alternatives

A number of fungicide and insecticide active ingredients are registered as seed treatments on the labelled crops to control or suppress plant diseases and insect pests on the Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, and NipsIt SUITE Canola Seed Protectant labels. There are currently no alternatives registered for use in carinata. Refer to Appendix I, Table 7 for further information on alternative products.

5.3.2 Compatibility with Current Management Practices Including Integrated Pest Management

As a seed treatment, pesticide application occurs prior to planting. The use of seed treatments can replace in-furrow or early season foliar pesticide applications and will not impede integrated pest management or other plant production practices.

5.3.3 Information on the Occurrence or Possible Occurrence of the Development of Resistance

Major seedling pathogens *Fusarium, Rhizoctonia, Pythium, Tilletia* and *Ustilago* were identified as low risk pathogens for resistance development by FRAC. Resistance to Group 3 fungicides has been observed in the lab for *F. graminearum* (wheat), *U. maydis* (corn), and *U. avenae* (oats), indicating that resistance management recommendations should still be observed for all pests. As a seed treatment, the products will be applied once at relatively low rates and, thus, should have little impact on the development of resistance; however, alternation rules should be considered when making subsequent foliar applications.

5.3.4 Contribution to Risk Reduction and Sustainability

These seed treatments offer broad spectrum disease control plus insect management at low rates. The number of foliar fungicide applications can be reduced for certain diseases.

6.0 Pest Control Product Policy Considerations

6.1 Toxic Substances Management Policy Considerations

The Toxic Substances Management Policy (TSMP) is a federal government policy developed to provide direction on the management of substances of concern that are released into the environment. The TSMP calls for the virtual elimination of Track 1 substances [those that meet all four criteria outlined in the policy, i.e. persistent (in air, soil, water and/or sediment),

bioaccumulative, primarily a result of human activity and toxic as defined by the *Canadian Environmental Protection Act*].

During the original review process, metconazole and its transformation products were assessed in accordance with the PMRA Regulatory Directive DIR99-03 and evaluated against the Track 1 criteria (ERC2011-02, *Metconazole*). The TSMP conclusions reached at that time apply to the current submission:

- Metconazole Fungicide Technical does not meet all Track 1 criteria, nor does it form any transformation products that meet all Track 1 criteria, and therefore is not considered a Track 1 substance.

6.2 Formulants and Contaminants of Health or Environmental Concern

During the current revised environmental review process, contaminants in the technical and formulants and contaminants in the end-use products were compared against the List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern maintained in the Canada Gazette. The list is used as described in the PMRA Notice of Intent NOI2005-01 and is based on existing policies and regulations including: DIR99-03 and DIR2006-02, and taking into consideration the Ozone-depleting Substance Regulations, 1998, of the Canadian Environmental Protection Act (substances designated under the Montreal Protocol). The PMRA has reached the following conclusions:

- Technical grade metconazole and the end use products Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant do not contain any formulants or contaminants of health or environmental concern identified in the Canada Gazette.

The use of formulants in registered pest control products is assessed on an ongoing basis through PMRA formulant initiatives and Regulatory Directive DIR2006-02.

7.0 Summary

7.1 Human Health and Safety

Please refer to PRD2013-11, *Metconazole* for the toxicology summary of metconazole.

New metabolism and residue data were submitted for seed treatment use of metconazole on canola (rapeseed), corn and wheat. The results of the radiotracer study with treated wheat and corn seeds indicated no uptake of radioactive residues into corn commodities and wheat forage, and limited translocation into wheat hay, grain and straw. The residue definitions in plants remain unchanged from those established for foliar uses (ERC2011-02, *Metconazole*). Acceptable validation data were submitted for the confirmatory method RM-41C-4 in corn. Supervised residue trials conducted at the label rate in NAFTA representative regions with metconazole on wheat as a seed treatment indicated that residues of metconazole (*cis*- and *trans*-isomers) were non-quantifiable (<0.02 ppm) in/on wheat forage, hay, grain and straw. Based on

foliar applications, MRLs for metconazole were established at 0.15 ppm for wheat and at 0.08 ppm for Crop Subgroup 20A (Rapeseed subgroup). The seed treatment uses of metconazole on wheat and canola (rapeseed) at lower rates and longer PHIs are not expected to result in residues exceeding the established MRLs. To support the use of metconazole as a seed treatment on corn, MRLs are proposed for metconazole at 0.04 ppm (LOQ of the enforcement method) in sweet corn kernels plus cob with husk removed, field corn and popcorn grain. No changes are required to the MRLs established for metconazole in livestock commodities.

The PMRA recommends that the following MRLs be specified for residues of metconazole:

Commodity	Recommended MRL (ppm)
0.04	Field corn, popcorn grain, sweet corn kernels plus cob with husks removed

Workers treating seed with Metlock Fungicide, NipsIt SUITE Cereals OF Seed Protectant, or NipsIt SUITE Canola Seed Protectant and workers planting treated seed are not expected to be exposed to levels of metconazole that will result in risks of concern when these products are used according to label directions. The personal protective equipment on the product label is adequate to protect workers.

7.2 Environmental Risk

When used for seed treatment on canola, rapeseed, carinata, corn and wheat, metconazole and Metlock Fungicide pose a negligible risk to bees, birds and small wild mammals if label statements regarding burial and cleanup of spilled treated seed are followed.

As the co-formulated end-use products, NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant, contain clothianidin and metalaxyl in addition to metconazole, mitigation measures on these end-use products are consistent with those of other registered seed treatment products containing clothianidin and metalaxyl.

7.3 Value

Other Group 3 fungicide seed treatment products are currently registered on wheat, corn, canola and rapeseed, some in combination with other fungicide and insecticide active ingredients. There are currently no alternatives registered for use in carinata. Registration of metconazole as a seed treatment on these crops provides growers with another disease management option.

8.0 Proposed Regulatory Decision

Health Canada's PMRA, under the authority of the *Pest Control Products Act* and Regulations, is proposing full registration for the sale and use of Metconazole Fungicide Technical and Metlock Fungicide, containing the technical grade active ingredient metconazole, to control or

suppression of seed- and soil-borne fungal pathogens in canola, rapeseed, carinata, corn and wheat.

The PMRA, under the authority of the *Pest Control Products Act* and Regulations, will be granting conditional registration for the sale and use of the end-use products NipsIt SUITE Cereals OF Seed Protectant and NipsIt SUITE Canola Seed Protectant due to the registration status of the clothianidin.

An evaluation of available scientific information found that, under the approved conditions of use, the product has value and does not present an unacceptable risk to human health or the environment.

List of Abbreviations

µg	microgram(s)
λ	wavelength
°C	degree Celsius
♂ and ♀	male and female symbols
a.i.	active ingredient
ADD	average daily dose
ADI	acceptable daily intake
ARfD	acute reference dose
bw	body weight
CAF	composite assessment factor
CAS	Chemical Abstracts Service
CI	confidence interval
DAP	days after planning
DEEM-FCID	Dietary Exposure Evaluation Model
dw	dry weight
EDE	estimated daily exposure
EEC	estimated environmental concentration
FDA	*Food and Drugs Act*
FIR	food ingestion rate
FRAC	Fungicide Resistance Action Committee
g	gram
GC-NPD	gas chromatography with nitrogen phosphorous detection
ha	hectare(s)
HAFT	highest average field trial
HCA	historical positive control
HDPE	high density polyethylene
IRAC	Insecticide Resistance Action Committee
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram
K_{ow}	*n*–octanol-water partition coefficient
L	litre
LADD	lifetime average daily dose
LAFT	lowest average field trial
LC_{50}	lethal concentration 50%
LC-MS/MS	liquid chromatography with tandem mass spectrometry
LD_{50}	lethal dose 50%
LOC	level of concern
LOQ	limit of quantitation
LSC	liquid scintillation counting
MAS	maximum average score
mg	milligram
mL	millilitre
MOE	margin of exposure
MQL	minimum quantifiable limit
MRL	maximum residue limit

n	number of test subjects
N/A	not applicable
NAFTA	North American Free Trade Agreement
nm	nanometre(s)
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
Pa	Pascal(s)
PCPA	*Pest Control Products Act*
PHI	preharvest interval
p*K*a	dissociation constant
PMRA	Pest Management Regulatory Agency
PPE	personal protective equipment
ppm	parts per million
Q_1*	cancer quotient
RQ	risk quotient
SD	standard deviation
SU	suspension
TRR	total radioactive residue
TSMP	Toxic Substances Management Policy
UV	ultraviolet
w/w	weight per weight

Appendix I Tables and Figures

Table 1 Acute Toxicity Profile of Metlock Fungicide, Nipslt SUITE Canola Seed Protectant, and Nipslt SUITE Cereals OF Seed Protectant Containing Metconazole
(Effects are known or assumed to occur in both sexes unless otherwise noted; in such cases, sex-specific effects are separated by semi-colons)

Study Type/Animal/PMRA #	Study Results
Nipslt SUITE Canola Seed Protectant	
Acute oral toxicity Female Sprague-Dawley derived, albino rats. Doses of 175, 550, 1750, or 5000 mg/kg bw Up and Down procedure (425) PMRA # 2244505	LD_{50} (♀) = 3129 mg/kg bw (95% CI of 1750 mg/kg bw to 5000 mg/kg bw **Low Toxicity**
Acute dermal toxicity 9-10 weeks old Sprague-Dawley derived, albino rats (5/sex) PMRA # 2244506	LD_{50} ♂/♀> 5000 mg/kg bw **Low Toxicity**
Acute inhalation toxicity (nose-only) Young adult Sprague-Dawley derived, albino rats (5 rats/sex/dose) PMRA # 2244507	LC_{50} ♂/♀ >2.08 mg/L **Low Toxicity**
Skin Irritation 3 male, New Zealand albino rabbits Dosed with 0.5 mL PMRA# 2244509	MAS (24-72 hours) = 0.43/8.0 **Minimally irritating**
Eye irritation 3 female New Zealand White rabbits Dosed with 0.1 mL (Not washed) (405) PMRA # 2244508	MAS ($_{24\text{-}72\ hours}$) = 1.55/110 **Minimally irritating**
Dermal sensitization (Beuhler test) (406) Hartley guinea pigs 10 for naïve control group 20- for test group 4 for preliminary irritation group 85% HCA (Historical positive control) PMRA # 2244510	 **Non-sensitizer**

Study Type/Animal/PMRA #	Study Results
Nipsit SUITE Cereals OF Seed Protectant	
Acute oral toxicity 3 Female Sprague-Dawley rats Dose at 5000 mg/kg bw (Up and Down procedure) PMRA # 2258490	LD_{50}♀ > 5000 mg/kg **Low Toxicity**
Acute dermal toxicity Sprague-Dawley rats (5/sex) Limit dose of 5000 mg/kg bw PMRA # 2258491	LD_{50}♂♀ > 5000 mg/kg bw **Low Toxicity**
Acute inhalation toxicity (nose-only) Sprague-Dawley rats (5 rats/sex/dose) Dosed at 2.06 mg/L PMRA # 2258492	LC_{50}♂/♀ >2.06 mg/L **Low toxicity**
Primary Skin Irritation 3 male, New Zealand albino rabbits Dosed with 0.5 mL for 4 hours PMRA # 2258497	MAS= 1.46/8.0 **Slightly-Irritating**
Eye irritation 3 young New Zealand White males Dosed with 0.1 mL of undiluted test substance PMRA # 2258493	MAS = 0.0/110 MIS (1 hour) = 5.3/110 **Non-Irritating**
Dermal sensitization (Beuhler test) (406) Hartley guinea pigs 10 for naïve control group 20- for test group 4 for preliminary irritation group 100% HCA (Historical positive control) **PMRA # 2112680**	 **Non-sensitizer**

Metlock Fungicide	Metlock Fungicide
Acute oral toxicity Female Sprague-Dawley rats Dose at 175, 550, 1750 or 5000 mg/kg bw (Up and Down procedure) (425) PMRA # 2200823	LD_{50}♀ = 4129 mg/kg (CI of 1750 to 5000 mg/kg bw) **Low Toxicity**
Acute dermal toxicity Sprague-Dawley rats (5/sex) Limit dose of 5000 mg/kg bw PMRA # 2200824	LD_{50}♂♀ > 5000 mg/kg bw **Low Toxicity**
Acute inhalation toxicity (nose-only) Sprague-Dawley rats (5 rats/sex) Dosed at 2.06 mg/L PMRA # 2200825	LC_{50}♂/♀ >2.03 mg/L One female during the limit test **Low Toxicity**
Primary Skin Irritation 3 female, New Zealand albino rabbits Dosed with 0.5 mL for 4 hours PMRA # 2200827	MAS= 0.1/8.0 **Minimally-Irritating**
Eye irritation 6 female young New Zealand White Rabbits (3/sex) Dosed with 0.1 mL of undiluted test substance PMRA # 2200826	MAS = 2.86/110 **Minimally-Irritating**
Dermal sensitization (Ritz and Beuhler test) (406) Hartley guinea pigs PMRA # 2200828	 **Non-Sensitizer**

Table 2 Toxicology Endpoints for Use in Health Risk Assessment for Metconazole

Exposure Scenario	Study	Point of Departure and Endpoint	CAF[1] or Target MOE
Acute dietary females ages 13-49	PMRA #1405646 Rabbit Oral Developmental Toxicity Study	NOAEL = 2 mg/kg bw Increased craniofacial malformations and liver variations.	1000
	ARfD (♀ 13-49) = 0.002 mg/kg bw/day		
Acute dietary general population	Not required		
Chronic dietary females ages 13-49	PMRA #1405646 Rabbit Oral Developmental Toxicity Study	NOAEL = 2 mg/kg bw/day Increased craniofacial malformations and liver variations.	1000
	ADI (♀ 13-49) = 0.002 mg/kg bw/day		
Chronic dietary general population	Combined Oral Rat Chronic and Oncogenicity Studies	NOAEL = 0.44 mg/kg bw/day Increased vacuolation of the adrenal cortex in males and females and necrotic inflammatory foci and clear cell foci in the liver of males	100
	ADI (gen pop) = 0.0044 mg/kg bw/day		
Short-term & Intermediate –term dermal	Rabbit Dermal Developmental Toxicity Study	NOAEL = 30 mg/kg bw/day Increased craniofacial and limb flexure malformations	1000
Short-term & Intermediate-term inhalation[2]	PMRA #1405646 Rabbit Oral Developmental Toxicity Study	NOAEL = 2 mg/kg bw/day Increased craniofacial malformations and liver variations.	1000
Cancer	Based on skin fibromas/sarcomas in male mice $Q_1^* = 8.0 \times 10^{-3}$ (mg/kg bw/day)$^{-1}$		

[1] CAF (composite assessment factor) refers to a total of uncertainty and PCPA factors for dietary assessments; MOE refers to a target MOE for occupational assessments

[2] Since an oral NOAEL was selected, an inhalation absorption factor of 100% (default value) was used in route-to-route extrapolation

Table 3 Residue Analysis

Matrix	Method ID	Analyte	Method Type	LOQ	Reference
Plant	RM-41C-4	Metconazole (*cis*- and *trans*-isomers)	LC-MS/MS (Data gathering)	0.02 ppm (total metconazole) in field corn grain and sweet corn kernel plus cob with husks removed	2112607

Table 4 Integrated Food Residue Chemistry Summary

NATURE OF THE RESIDUE IN CORN AND WHEAT RADIOTRACER STUDY				PMRA # 2112611
Radiolabel Position	[1-cyclopentyl-^{14}C]-metconazole; [3-triazole-^{14}C]-metconazole and/or [5-triazole-^{14}C]-metconazole			
Test Site	The treated wheat and corn seeds were each planted in outdoor field plots during the 2009 growing season.			
Treatment	Seed treatment			
Total Rate	The target treatment rates were 1.5 g a.i./100 kg seeds (low rate) and 2.5 g a.i./100 kg seeds (high rate) for both wheat and corn. The actual rates applied were 1.48-1.55 g a.i./100 kg seeds and 2.43-2.59 g a.i./100 kg seeds for wheat, and 1.69-1.74 g a.i./100 kg seed and 2.99-3.09 g a.i./100 kg for corn.			
Formulation	The radiolabeled test solutions (368E for cyclopentyl label and 369 L for triazole label) and a V-101163.7FS VC1740 formulation blank were used to treat the parent seed samples.			
Preharvest interval	Samples of wheat were harvested 29 and 58 days after planting (DAP) for immature forage, 87 DAP for immature hay, and mature grain and straw were harvested 105 DAP. For corn, immature samples of kernel plus cob were harvested 110 DAP, immature forage was harvested 114 DAP, and mature grain and stover (grain-free cobs and stalks) were harvested 128 DAP.			
Matrices	**Target Rate (g a.i./100 kg seeds)**	**DAP**	**1-cyclopentyl-^{14}C]-metconazole**	**3-triazole-^{14}C]-metconazole and/or [5-triazole-^{14}C]-metconazole**
			Mean TRRs (ppm)[1]	**Mean TRRs (ppm)[1]**
Wheat forage	1.5	29-58	Not analyzed	Not analyzed
	2.5		<0.005	<0.005
Wheat hay	1.5	87	0.014	0.019
	2.5		0.013	0.015
Wheat straw	1.5	105	0.014	0.016
	2.5		0.016	0.017
Wheat grain	1.5	105	Not analyzed	0.010
	2.5		<0.005	0.018
Corn kernel + cob	1.5	110	Not analyzed	Not analyzed
	2.5		<0.005	<0.005
Corn forage	1.5	114	Not analyzed	Not analyzed
	2.5		<0.005	<0.005
Corn stover	1.5	128	Not analyzed	Not analyzed
	2.5		<0.005	<0.005
Corn grain	1.5	128	Not analyzed	Not analyzed
	2.5		<0.005	<0.005

[1]Expressed as metconazole equivalents; n = 2.

The total radioactive residues (TRRs) were determined by combustion and liquid scintillation counting (LSC). The minimum quantifiable limit (MQL) was reported as 0.005 ppm. Control wheat and corn samples did not show any residues above background.

NATURE OF THE RESIDUE IN CORN AND WHEAT RADIOTRACER STUDY	PMRA # 2112611
CROP FIELD TRIALS & RESIDUE DECLINE ON WHEAT	**PMRA # 2112608 and 2112609**

Field trials were conducted in 2007, 2008 and 2009 in Canada and the United States in NAFTA Growing Regions 2 (GA; 1 trial), 4 (AR; 1 trial), 5 (MN, MB, MO, NE, OH; 6 trials), 6 (OK; 1 trial), 7 (SK, NE, ND; 7 trials), 7A (AB; 1 trial), 8 (TX, KS, OK; 6 trials), 11 (ID; 1 trial) and 14 (MB, SK and AB; 9 trials) for a total of 33 trials.

Wheat seed was treated with a 47.8% w/w flowable solution of clothianidin (V-10170 5FS) and a 50% w/w water dispersible granule formulation of metconazole (V-10116 50WDG) at a target rate of 1.5 g a.i./100 kg seed for metconazole. The actual treatment rates were 1.04 to 1.77 g a.i./100 kg seed for metconazole. No adjuvants were reported to have been used in the application mixture for seed treatment.

Treated wheat seed was planted (fall 2007, spring 2008, fall 2008 or spring 2009) using commercial wheat drills, or research equipment simulating commercial wheat drills at typical seeding rates. Samples of wheat were collected at the normal harvest times: 32-228 DAP for forage, 60-255 DAP for hay, and 102-286 DAP for grain and straw. Samples of hay were cut 56-251 DAP and were dried for 1 to 24 days prior to collection (i.e. 60-255 DAP).

Samples were analyzed for metconazole from only 16 sites (2 trials in region 5; 6 trials in region 7 and 8 trials in region 14) instead of all 33 sites in order to support the registration in Canada. For the wheat samples that were analyzed, wheat seed was treated at 1.57-1.77 g a.i.100 kg seed.

Total residues of metconazole (*cis*- and *trans*- isomers) were determined using a liquid chromatography method with tandem mass spectrometry (LC-MS/MS). At one trial, analysis by LC-MS/MS was replaced with gas chromatography with nitrogen phosphorus detection (GC-NPD). The LOQ was reported as 0.02 ppm for total metconazole (*cis*- and *trans*- isomers) in wheat forage, hay, grain and straw, using both detection methods.

No residue decline data were submitted for metconazole on wheat as a seed treatment, or are required for the purposes of these submissions. It is stated in Section 9.7 (Residue Decline Studies) of DIR98-02-*Residue Chemistry Guidelines* that "Residue decline data are needed for uses where (1) the agricultural chemical is applied when the edible portion of the crop has formed, or (2) it is clear that quantifiable residues may occur on the food or feed commodities at, or close to, the earliest harvest time, or (3) the PHI is ≤14 days."

Commodity	Total Application Rate (g a.i./100 kg seeds)	PHI (days)	Residue Levels (ppm)							
			n	Min. #	Max. #	LAFT *	HAFT *	Median *	Mean *	SD *
Total Metconazole (*cis*- and *trans*- isomers)										
Wheat forage	1.57-1.77	32-228	16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0
Wheat hay		60-255	16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0
Wheat grain		102-286	16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0
Wheat straw		102-286	16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0

Values based on total number of samples.
* Values based on per-trial averages. LAFT = Lowest Average Field Trial, HAFT = Highest Average Field Trial, SD = Standard Deviation. For computation of the LAFT, HAFT, median, mean and standard deviation, values < LOQ are assumed to be at the LOQ.
n = number of field trials.

NATURE OF THE RESIDUE IN CORN AND WHEAT RADIOTRACER STUDY	PMRA # 2112611
PROCESSED FOOD AND FEED - WHEAT	**PMRA # 2112608 and 2112609**
Test Site	Two trials in NAFTA Growing Regions 7 (North Dakota) and 14 (Manitoba).
Treatment	Seed treatment
Rate	The target rate was 7.5 g a.i./100 kg seeds. The actual rates were 8.17 g a.i./100 kg seeds and 8.22 g a.i./100 kg seeds at the North Dakota Manitoba site sites, respectively.
End-use product/formulation	A 47.8% w/w flowable solution of clothianidin (V-10170 5FS) and a 50% w/w water dispersible granule formulation of metconazole (V-10116 50WDG)
Preharvest interval	Samples of grain were collected at normal harvest times: 109 DAP at the North Dakota site and at 119 DAP at the Manitoba site.
Residues of total metconazole (cis- and trans- isomers) were <LOQ (<0.02 ppm) in all control and treated samples of wheat grain from seed treated at approximately 5x the maximum label rate. As such, the wheat grain samples were not processed and analyzed.	

Table 5 Screening Level Risk Assessment for Birds and Mammals Based on Seed Treatment Rate of 1.5 g a.i./100 kg Seed on Wheat, Canola, Rapeseed and Carinata

Type of Exposure	Toxicity[1] (mg a.i./kg bw/day)	Uncertainty Factor	EDE[2] (mg a.i./kg bw/day)	RQ[3]	LOC exceeded?
Small bird (0.02 kg)					
Acute	798	0.1	3.81	0.48	No
Reproduction	11.73	1	3.81	0.32	No
Medium bird (0.10 kg)					
Acute	798	0.1	2.99	0.37	No
Reproduction	11.73	1	2.99	0.26	No
Large bird (1.00 kg)					
Acute	798	0.1	0.87	0.11	No
Reproduction	11.73	1	0.87	0.07	No
Small mammals (0.015 kg)					
Acute	566	0.1	2.18	0.38	No
Reproduction	9.05	1	2.18	0.24	No
Medium mammals (0.035 kg)					
Acute	566	0.1	1.87	0.33	No
Reproduction	9.05	1	1.87	0.21	No
Large mammals (1.00 kg)					
Acute	566	0.1	1.03	0.18	No
Reproduction	9.05	1	1.03	0.11	No

[1] Toxicity endpoints (LD_{50} and NOEL) were taken from Table 19, Appendix 1 in ERC2011-02-*Metconazole*.

Toxicity (# seeds/per day) = Toxicity Dose (mg a.i./kg bw/day) × bw (kg) ÷ mg a.i./seed

[2] EDE (Estimated Daily Exposure) (# seeds /day) = FIR (g dw/day) × (# seeds)/g Food Ingestion Rates (FIR) × seeds/g .

FIR for generic body weights for birds and mammals (Nagy, 1987):

BIRDS - For birds with body weight less than or equal to 200 g, the "passerine" equation was used; for generic birds with body weight greater than 200 g, the "all birds" equation was used.

Passerine Equation (body weight ≤ 200 g): FIR (g dw/day) = $0.398(\text{bw in g})^{0.850}$

All birds Equation (body weight > 200 g): FIR (g dw/day) = $0.648(\text{bw in g})^{0.651}$

MAMMALS - The all mammals equation was used.

All mammals Equation: FIR (g dw/day) = $0.235(\text{bw in g})^{0.822}$

[3] RQ = EDE/Toxicity

Table 6 Screening Level Risk Assessment for Birds and Mammals Based on Seed Treatment Rate of 2.5 g a.i./100 kg Seed on Corn.

Type of Exposure	Toxicity[1] (mg a.i./kg bw/day)	Uncertainty Factor	EDE[2] (mg a.i./kg bw/day)	RQ[3]	LOC exceeded?
Small bird (0.02 kg)					
Acute	798	0.1	3.81	0.80	No
Reproduction	11.73	1	3.81	0.54	No
Medium bird (0.10 kg)					
Acute	798	0.1	2.99	0.62	No
Reproduction	11.73	1	2.99	0.43	No
Large bird (1.00 kg)					
Acute	798	0.1	0.87	0.18	No
Reproduction	11.73	1	0.87	0.12	No
Small mammals (0.015 kg)					
Acute	566	0.1	2.18	0.64	No
Reproduction	9.05	1	2.18	0.40	No
Medium mammals (0.035 kg)					
Acute	566	0.1	1.87	0.55	No
Reproduction	9.05	1	1.87	0.34	No
Large mammals (1.00 kg)					
Acute	566	0.1	1.03	0.30	No
Reproduction	9.05	1	1.03	0.19	No

[1] Toxicity endpoints (LD_{50} and NOEL) were taken from Table 19, Appendix 1 in ERC2011-02 -*Metconazole*.

Toxicity (# seeds/per day) = Toxicity Dose (mg a.i./kg bw/day) × bw (kg) ÷ mg a.i./seed

[2] EDE (Estimated Daily Exposure) (# seeds /day) = FIR (g dw/day) × (# seeds)/g Food Ingestion Rates (FIR) × seeds/g

FIR for generic body weights for birds and mammals (Nagy, 1987):

BIRDS - For birds with body weight less than or equal to 200 g, the "passerine" equation was used; for generic birds with body weight greater than 200 g, the "all birds" equation was used.

Passerine Equation (body weight ≤ 200 g): FIR (g dw/day) = $0.398(\text{bw in g})^{0.850}$

All birds Equation (body weight > 200 g): FIR (g dw/day) = $0.648(\text{bw in g})^{0.651}$

MAMMALS - The all mammals equation was used.

All mammals Equation: FIR (g dw/day) = $0.235(\text{bw in g})^{0.822}$

[3] RQ = EDE/Toxicity

Table 7 Alternative Seed Treatments for Control or Suppression of Pathogens and Insect Pests Indicated on the Metlock Fungicide, Nipslt SUITE Cereals OF Seed Protectant, and Nipslt SUITE Canola Seed Protectant Labels

Crop	Pest	Active Ingredient(s) (FRAC /IRAC Code)
Wheat	*Fusarium* spp.	tebuconazole (3) ipconazole (3) triticonazole (3) prothioconazole (3) difenoconazole (3) pyraclostrobin (11) thiram + carbathiin (M + 7)
	Pythium spp.	metalaxyl (4) metalaxyl-m & s-isomer (4) thiram + carbathiin (M + 7)

Crop	Pest	Active Ingredient(s) (FRAC /IRAC Code)
	Rhizoctonia solani	sedaxane (7)
	Cochliobolus sativus	tebuconazole (3) ipconazole (3) triticonazole (3) prothioconazole (3) difenoconazole (3) fluxapyroxad (7) pyraclostrobin (11) thiram + carbathiin (M + 7)
	common bunt	tebuconazole (3) triticonazole (3) prothioconazole (3) difenoconazole (3) penflufen (7) maneb (M) thiram + carbathiin (M + 7)
	loose smut	tebuconazole (3) ipconazole (3) triticonazole (3) prothioconazole (3) difenoconazole (3) penflufen (7) sedaxane (7) carbathiin (7) thiram + carbathiin (M + 7)
	wireworms	imidicloprid (4A) thiamethoxam (4A)
Corn	*Fusarium* spp.	thiabendazole (1) ipconazole (3) prothioconazole (3) difenoconazole (3) trifloxystrobin (11) fludioxonil (12)
	Rhizoctonia solani	ipconazole (3) penflufen (7) sedaxane (7) azoxystrobin (11) pyraclostrobin (11) fludioxonil (12)
Canola	*Pythium* spp.	metalaxyl (4) metalaxyl-m & s-isomer (4) thiram + carbathiin (M + 7)
	Fusarium spp.	ipconazole (3) difenoconazole (3) penflufen (7) pyraclostrobin (11) fludioxonil (12) *Bacillus subtilis* (44)
	Rhizoctonia solani	iprodione (2) ipconazole (3) difenoconazole (3) penflufen (7) sedaxane (7) azoxystrobin (11)

Crop	Pest	Active Ingredient(s) (FRAC /IRAC Code)
		pyraclostrobin (11) trifloxystrobin (11) fludioxonil (12) thiram + carbathiin (M + 7) *Bacillus subtilis* (44)
	seed-borne blackleg	iprodione (2) difenoconazole (3) penflufen (7) pyraclostrobin (11) trifloxystrobin (11) fludioxonil (12) thiram + carbathiin (M + 7)
	flea beetles	acetamiprid (4A) clothianidin (4A) imidicloprid (4A) thiamethoxam (4A)
Rapeseed	*Pythium* spp.	thiram + carbathiin (M + 7)
	Fusarium spp.	ipconazole (3) penflufen (7)
	Rhizoctonia solani	ipconazole (3) penflufen (7) sedaxane (7) trifloxystrobin (11) thiram + carbathiin (M + 7)
	seed-borne blackleg	penflufen (7) trifloxystrobin (11) thiram + carbathiin (M + 7)
	flea beetles	clothianidin (4A) imidicloprid (4A)
Carinata	*Pythium* spp. *Fusarium* spp. *Rhizoctonia solani* seed-borne blackleg flea beetles	No registered alternatives.

Tables 8.1 – 8.3 Use (label) Claims Proposed by Applicant and Whether Acceptable or Unsupported

Table 8.1 Metlock Fungicide (some claims were supported based on modified wording to be consistent with other registered seed treatment products)

Proposed use claim	Supported / Unsupported
Control of seed/seedling dieback caused by *Fusarium* spp. on corn at rates of 2.8 – 5.7 ml/100 kg seed (1.2 – 2.5 g a.i./100 kg seed).	Supported as control of seed rot/pre-emergence damping-off caused by *Fusarium* spp. on corn at the proposed rates.
Control of damping-off caused by *Rhizoctonia* spp. on corn at rates of 2.8 – 5.7 ml/100 kg seed (1.2 – 2.5 g a.i./100 kg seed).	Supported as control of seed rot/pre-emergence damping-off and post-emergence damping-off caused by *Rhizoctonia solani* on corn at the proposed rates.
Control of early season seed/seedling root rot infections caused by *Fusarium* spp. on wheat at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed).	Supported as control of seed rot/ pre-emergence damping-off caused by *Fusarium* spp. on wheat at the proposed rate.
Control of early season seed/seedling root rot	Supported as control of seed rot/pre-emergence

Proposed use claim	Supported / Unsupported
infections caused by *Rhizoctonia* spp. on wheat at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed).	damping-off caused by *Rhizoctonia solani* on wheat at the proposed rate.
Control of early season seed/seedling root rot infections caused by *Cochliobolus sativus* on wheat at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed)	Supported as suppression of common root rot caused by *Cochliobolus sativus* on wheat at the proposed rate.
Control of common bunt (*Tilletia laevis*) on wheat at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed)	Supported as proposed.
Control of seed/seedling dieback caused by *Fusarium* spp. on canola, rapeseed and carinata (*Brassica carinata*) at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed).	Supported as control of seed rot/pre-emergence damping-off caused by *Fusarium* spp. on canola, rapeseed and carinata (*Brassica carinata*) at the proposed rate.
Control of damping-off caused by *Rhizoctonia* spp. on canola, rapeseed and carinata (*Brassica carinata*) at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed).	Supported as control of post-emergence damping-off caused by *Rhizoctonia solani* on canola, rapeseed and carinata (*Brassica carinata*) at the proposed rate.
Control of seed-borne blackleg (*Leptosphaeria maculans*) on canola, rapeseed and carinata (*Brassica carinata*) at a rate of 3.4 ml/100 kg seed (1.5 g a.i./100 kg seed)	Supported as suppression of seed-borne blackleg (*Leptosphaeria maculans*) on canola, rapeseed and carinata (*Brassica carinata*) at the proposed rate.

Table 8.2 NipsIt SUITE Cereals OF Seed Protectant (some claims were supported based on modified wording to be consistent with other registered seed treatment products)

Proposed use claim	Supported / Unsupported
Early season seed rot/pre-emergence damping-off, post-emergence damping-off, seedling blight and seedling root rot caused by *Pythium* spp. on wheat at 326 ml/100 kg seed.	Supported as proposed.
Early season seed/seedling root rot caused by *Rhizoctonia* spp. on wheat at 326 ml/100 kg seed.	Control of early season seed rot/pre-emergence damping-off caused by *Rhizoctonia solani* at the proposed rate.
Early season seed/seedling root rot caused by *Fusarium* spp. on wheat at 326 ml/100 kg seed.	Control of early season seed rot/pre-emergence damping-off caused by *Fusarium* spp. at the proposed rate.
Early season seed/seedling root rot caused by *Cochliobolus sativus* on wheat at 326 ml/100 kg seed.	Suppression of common root rot caused by *Cochliobolus sativus* at the proposed rate.
Control of common bunt (*Tilletia laevis*) on wheat at 326 ml/100 kg seed.	Supported as proposed.
Suppression of wireworms on wheat at 326 ml/100 kg seed.	Supported as proposed
Control of loose smut (Ustilago tritici) on wheat at 326 ml/100 kg seed.	Supported as proposed; confirmatory value information is required.

Table 8.3 NipsIt SUITE Canola Seed Protectant (some claims were supported based on modified wording to be consistent with other registered seed treatment products)

Proposed claim	Supported / Unsupported
Control of seed rot/pre-emergence damping-off, post-emergence damping-off, seedling blight and seedling root rot caused by *Rhizoctonia* spp. on canola, rapeseed and carinata (*Brassica carinata*) at 1.43 L/100 kg seed.	Control of post-emergence damping off caused by *Rhizoctonia solani* on canola, rapeseed and carinata (*Brassica carinata*) at the proposed rate.
Control of seed rot/pre-emergence damping-off, post-emergence damping-off, seedling blight and seedling root rot caused by *Fusarium* spp. on canola, rapeseed	Control of seed rot/pre-emergence damping off and post-emergence damping off caused by *Fusarium* spp. on canola, rapeseed and carinata (*Brassica carinata*) at the

Proposed claim	Supported / Unsupported
and carinata (*Brassica carinata*) at 1.43 L/100 kg seed.	proposed rate
Control of seed-borne blackleg (*Leptosphaeria maculans*) on canola, rapeseed and carinata (*Brassica carinata*) at 1.43 L/100 kg seed.	Suppression of seed-borne blackleg caused by *Leptosphaeria maculans* on canola, rapeseed and carinata (*Brassica carinata*) at the proposed rate
Control of seed rot/pre-emergence damping-off, post-emergence damping-off, seedling blight and seedling root rot caused by *Pythium* spp. on canola, rapeseed and carinata (*Brassica carinata*) at 1.43 L/100 kg seed.	Supported as proposed.
Control of flea beetles on canola, rapeseed and carinata (*Brassica carinata*) at 1.43 L/100 kg seed.	Supported as proposed.

Appendix II Supplemental Maximum Residue Limit Information—International Situation and Trade Implications

MRLs may vary from one country to another for a number of reasons, including differences in pesticide use patterns and the locations of the field crop trials used to generate residue chemistry data.

Table 1 compares the MRLs proposed for metconazole in Canada with corresponding American tolerances. American tolerances are listed in the Electronic Code of Federal Regulations, 40 CFR Part 180, by pesticide. Currently, there are no Codex MRLs[5] listed for metconazole in or on any commodity on the Codex Alimentarius Pesticide Residues in Food website.

Table 1 Comparison of Canadian MRLs, American Tolerances and Codex MRLs (where different)

Food Commodity	Canadian MRL (ppm)	American Tolerance (ppm)	Codex MRL (ppm)
Field corn	0.04	0.02 (Field corn grain)	Not established
Popcorn grain	0.04	0.02	Not established
Sweet corn kernels plus cob with husks removed	0.04	0.01	Not established

Under the North American Free Trade Agreement (NAFTA), Canada, the United States and Mexico are committed to resolving MRL discrepancies to the broadest extent possible. Harmonization will standardize the protection of human health across North America and promote the free trade of safe food products. Until harmonization is achieved, the Canadian MRLs specified in this document are necessary. The differences in MRLs outlined above are not expected to impact businesses negatively or adversely affect international competitiveness of Canadian firms or to negatively affect any regions of Canada.

5 The Codex Alimentarius Commission is an international organization under the auspices of the United Nations that develops international food standards, including MRLs.

References

A. List of Studies/Information Submitted by Registrant

1.0 Chemistry

PMRA Document Number	Reference
2106236	2011, Metconazole Fungicide Technical (KNF-S-474m): Product Chemistry Group A - Composition, Starting Materials, Description of the Production Process, and discussion of the Formation of Impurities – [Privacy information removed] DACO: 2.11.1,2.11.2 CBI
2106243	2011, Amendment of Suppliers List of Starting Materials for Metconazole Fungicide Technical, Produced at Rallis, India, EPA Registration Number 72078-1, DACO: 2.11.2 CBI
2106240	2011, Metconazole Fungicide Technical (KNF-S-474m): Product Chemistry Group A - Preliminary Analysis, Certified Limits, and Enforcement Analytical Method - [Privacy information removed], DACO: 2.13,2.13.1,2.13.2,2.13.3,2.13.4 CBI
2180001	2012, [CBI REMOVED] Content CofA, DACO: 2.13.3 CBI
2180002	2012, Re: Clarification Response for Category A Submission for Metconazole Fungicide Technical (Sub. No. 2010-6216, Reg. No. 29766) - Addition of New USC for Seed Treatment and New Source of Technical, DACO: 2.13.3 CBI
1996017	2010, Physical and Chemical Properties of V-10262 2.38 FS, DACO: 3.5.1,3.5.12,3.5.15,3.5.2,3.5.3,3.5.6,3.5.7,3.5.8,3.5.9
1996018	2010, Physical and Chemical Properties for Nipslt SUITE Canola Seed Protectant: Formulation Type, Container Material and Description, Storage Stability, Flammability, Miscibility, and Corrosion Characteristics, DACO: 3.5.10,3.5.11,3.5.13,3.5.14,3.5.4,3.5.
2244788	2012, Shelf-Life Storage Stability and Corrosion Characteristics of V- 10262 2.3 8 FS, DACO: 3.5.10,3.5.14
1996012	2010, Product Identity and Composition of Nipslt SUITE Canola Seed Protectant; Description of Materials Used to Produce the Product Nipslt SUITE Canola Seed Protectant; Description of Production Process for Nipslt SUITE Canola Seed Protectant; Description of Formulation Process for Nipslt SUITE Canola Seed Protectant; Discussion of Formation of Impurities for Nipslt SUITE Canola Seed Protectant; Preliminary Analysis of Nipslt SUITE Canola Seed Protectant Certified Limits for Nipslt SUITE Canola Seed Protectant; Enforcement Analytical Method for Nipslt SUITE Canola Seed Protectant; Submittal of Samples for Nipslt SUITE Canola Seed Protectant, DACO: 3.1.2,3.1.3,3.1.4,3.2.1,3.2.2,3.3.1,3.4.1 CBI?
2244782	2012, Additional Data in Support of Enforcement Analytical Method VAM-22j-001: Quantitation of Clothianidin, Metalaxyl, cis-Metconazole and trans-Metconazole in V-10262 2.38 FS (VC # 1867) by HPLC and GC, DACO: 3.4.1
1996016	2010, Product Identity and Composition of Nipslt SUITE Canola Seed Protectant; Description of Materials Used to Produce the Product Nipslt SUITE Canola Seed Protectant; Description of Production Process for Nipslt SUITE Canola Seed Protectant; Description of Formulation Process for Nipslt SUITE Canola Seed Protectant, DACO: 3.1.2,3.1.3,3.1.4,3.2.1,3.2.2,3.3.1,3.4.1, CBI
2112588	2010, Physical and Chemical Properties of V-10116 3.7 FS, DACO: 3.5.1,3.5.10,3.5.11,3.5.12,3.5.13,3.5.14,3.5.15,3.5.2,3.5.3,3.5.6,3.5.7,3.5.8,3.5.9 CBI

2112585 2011, Physical and Chemical Properties for METLOCK Fungicide: Applicant Information, Formulator Information, Product Names, Formulation Type, Container Material and Description, Storage Stability, and Corrosion Characteristics, DACO: 3.1.1,3.1.2,3.1.3,3.1

2244740 2012, Shelf-Life Storage Stability and Corrosion Characteristics of V-10116 3.7 FS, DACO: 3.5.10,3.5.14

2112586 2010, Product Identity and Composition of V-10116 3.7 FS Description of Materials Used to Produce the Product V-10116 3.7 FS Description of Production Process for V-10116 3.7 FS Description of Formulation Process for V-10116 3.7 FS Discussion of Formation of Impurities for V-10116 3.7 FS Preliminary Analysis of V-10116 3.7 FS Certified Limits for V-10116 3.7 FS Enforcement Analytical Method for V-10116 3.7 FS Submittal of Samples for V-10116 3.7 FS, DACO: 3.1.2,3.1.4,3.2.1,3.2.2,3.2.3,3.3.1,3.4.1,3.4.2

2112666 2011, Comprehensive Summary for Nipsit SUITE Cereals OF Seed Protectant, DACO: 12.7

2244709 2011, Nipsit SUITE Cereals OF Seed Protectant: Physical and Chemical Properties of V-10304 0.37 FS, DACO: 3.5.1,3.5.11,3.5.12,3.5.13,3.5.15,3.5.2,3.5.3,3.5.4,3.5.5,3.5.6,3.5.7,3.5.8,3.5.9

2244710 2012, Shelf-Life Storage Stability and Corrosion Characteristics of V-10304 0.37 FS, DACO: 3.5.10,3.5.14

2112671 2011, Product Identity and Composition of NipsItTM SUITE Cereals OF Seed Protectant; Description of Materials Used to Produce the Product NipsItTM SUITE Cereals OF Seed Protectant; Description of Production Process for NipsItTM SUITE Cereals OF Seed Protectant; Description of Formulation Process for NipsItTM SUITE Cereals OF Seed Protectant; Discussion of Formation of Impurities for NipsItTM SUITE Cereals OF Seed Protectant; Preliminary Analysis of NipsITM SUITE Cereals OF Seed Protectant Certified Limits for NipsItTM SUITE Cereals OF Seed Protectant; Enforcement Analytical Method for Nipsltm SUITE Cereals OF Seed Protectant; Submittal of Samples for NipsItTM SUITE Cereals OF Seed Protectant, DACO: 3.2.1,3.2.2,3.2.3,3.3.1,3.4.1,3.4.2 CBI

2.0 Human and Animal Health

PMRA Document Number	Reference
2112607	2011, Validation of the Analytical Method Used to Determine Residues of Metconazole in Corn, DACO: 7.2.1,7.2.2,7.2.3
2112608	2011, Clothianidin and Metconazole Residues on Wheat and Wheat Processed Commodities from Trials Conducted in the United States and Canada in 2007, 2008 and 2009, DACO: 7.4.1
2112609	2011, Clothianidin and Metconazole Residues on Wheat and Wheat Processed Commodities from Trials Conducted in the United States and Canada in 2007, 2008 and 2009, DACO: 7.4.1
2112611	2010, Residues in Crops Grown from Seeds Treated with [Cyclopentyl-14C]Metconazole and [Triazole-14C]Metconazole, DACO: 7.8
1996022	2010, Acute Oral Toxicity Up and Down Procedure in Rats, DACO: 4.6.1
1996023	2010, Acute Dermal Toxicity Study in Rats - Limit Test, DACO: 4.6.2
1996024	2010, Acute Inhalation Toxicity Study in Rats - Limit Test, DACO: 4.6.3
1996025	2010, Primary Eye Irritation Study in Rabbits, DACO: 4.6.4
1996026	2010, Primary Skin Irritation Study in Rabbits, DACO: 4.6.5
1996027	2010, Dermal Sensitization Study in Guinea Pigs [Buehler Method], DACO: 4.6.6
2112590	2008, Acute Oral Toxicity Up and Down Procedures in Rats with V 10116-3.7-FS (VC- 1 740), DACO: 4.6.1
2112591	2008, Acute Dermal Toxicity Study in Rats with V-10116-3.7-FS (VC-1740), DACO: 4.6.2
2112592	2008, Acute Inhalation Toxicity Study in Rats with V-10116-3.7-FS (VC- 1740), DACO: 4.6.3
2112593	2008, Primary Eye Irritation Study in Rabbits with V-10116-3.7-FS (VC-1749), DACO: 4.6.4

2112595 2008, Primary Skin Irritation in Rabbits with V-10116-3.7-FS (VC-1740), DACO: 4.6.5

2112596 2008, Dermal Sensitization Study in Guinea Pigs (Buehler Method) with V-10116-3.7-FS (VC-1740), DACO: 4.6.6

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